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MAY/2017

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“The **Ford GT is a
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and a clockwork of
rare nuance.”**

—Eric Tingwall, p. 036



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McLAREN 720S REVEALED
NISSAN SENTRA NISMO DRIVEN
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Options shown. LC arriving May 2017. ©2017 Lexus

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Once you notice the asymmetrical mirrors, you'll never be able to not see them.

photography by Greg Pajo

Car and Driver[®] vol. 62, no. 11

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"I feel as if my gut has been run through a Vitamix and is now sweating out through my palms."

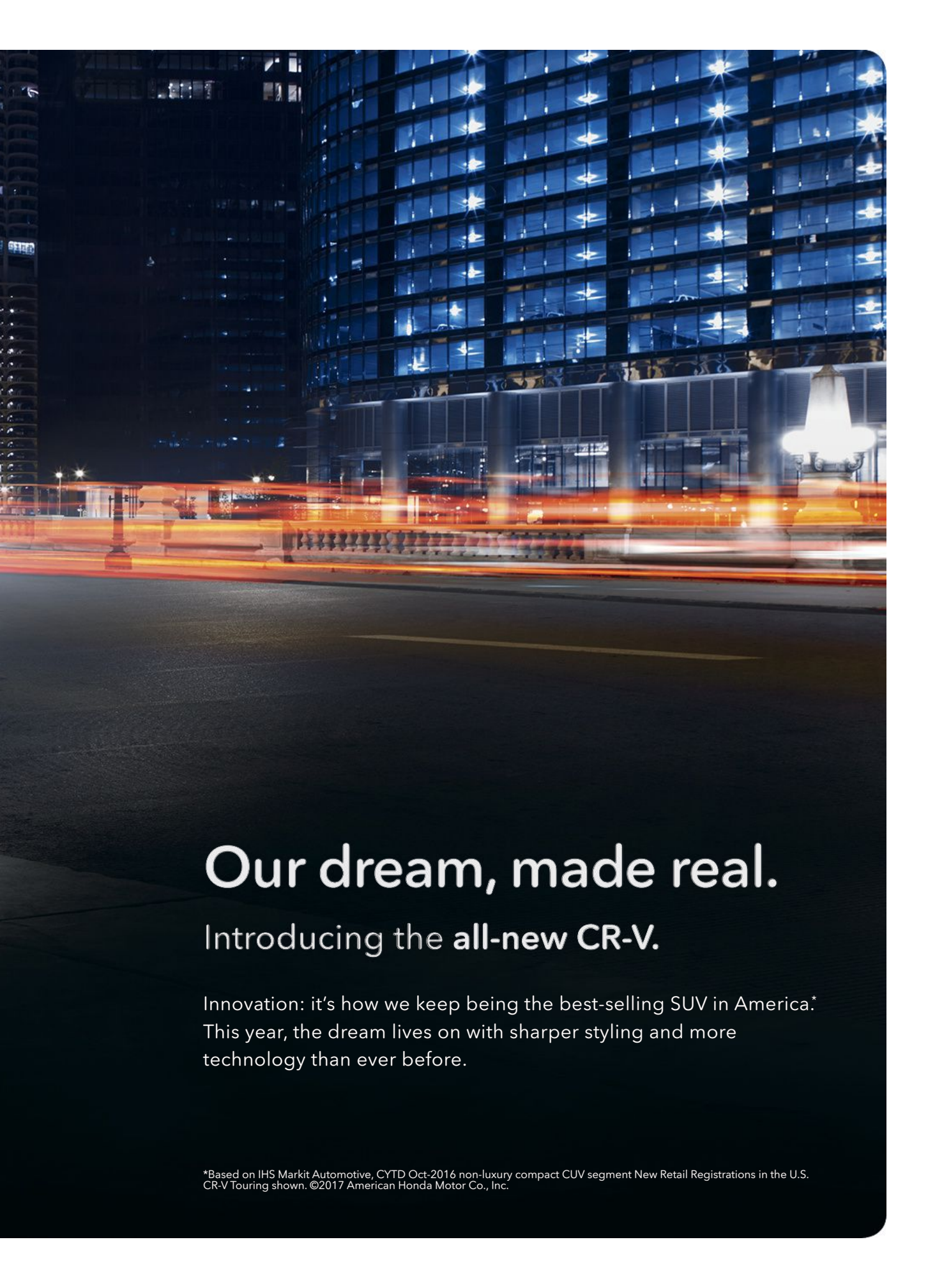
—ERIC TINGWALL, "PRETTY SICK"

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*Based on IHS Markit Automotive, CYTD Oct-2016 non-luxury compact CUV segment New Retail Registrations in the U.S.
CR-V Touring shown. ©2017 American Honda Motor Co., Inc.



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Creeping around never felt so right.
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CARandDRIVER.com/2017V90XC

FORD F-350 SUPER DUTY DIESEL 4X4

It drives smaller than it looks. No, really!
CARandDRIVER.com/2017F350

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Backfires:

The joyful noise of the commentariat, rebutted sporadically by Ed.

ISSUE AT HAND

Groan. Another *Car and Driver* with a truck on the cover ["Raptor!" February 2017]. But then, my disgust turned to delight when I read the first five Backfires letters complaining about the "Best Crossovers and SUVs" cover on the November 2016 issue. At least you guys are honest about your irony. Bravo!

—Kevin Risdon
High Point, NC

When I received the February issue, my first impression was that this was your annual April Fools' edition with the Ford F-150 Raptor on the cover and the other cover lines emphasizing the testing of the Lincoln Continental and Maserati SUV. Then I noticed the February 2017 date on the cover! I have been reading *Car and Driver* for more than 35 years and plan to continue to do so unless there is a continued focus on SUVs and trucks—like the November issue. This is not the heart, soul, and substance of the *Car and Driver* magazine that I have enjoyed over the years. I am not one of those people who demands to have their subscription

canceled, but I am one of those people who may not renew my subscription in the future. Come on, guys; get back to writing about cars!

—Ken Westbrook
San Diego, CA

Kudos on the February issue, which isn't all about \$250,000 cars with 800 horsepower. I've actually seen some of the vehicles in this issue, which is more than I can say about your recent work. Regarding the graphs, enough has been said, except maybe, "The graphs suck." While you are fixing things, how about increasing the eight-point type on your features to something those of us with old eyes can actually



"I'VE ACTUALLY SEEN SOME OF THE VEHICLES IN THIS ISSUE, WHICH IS MORE THAN I CAN SAY ABOUT YOUR RECENT WORK."

read? Oh, and did I mention that the graphs suck?

—Les Szigethy
Portland, OR

There's a reason I've been an avid *C/D* fan for 50 years, and it's the writing. Yes, it's still great, but does every title have to be a pun? "Mint Jelly," "Alfa Bits," and "Wear Your Flare" (what the hell does that one even mean?).

—Terry Collins
Homewood, IL

Boy, that's just a straight shooter with upper management written all over him—Ed.

PREY FOR ME

Regarding your Ford F-150 Raptor test ["Mint Jelly," February 2017], I can't understand why it needs a 10-speed transmission when it

has a two-speed transfer case; you said it has trouble finding the right gear when downshifting. Also, where's the Aston Martin grille that Ford seems to put on everything these days? Maybe it would have had to make the Ford badge on the front too small.

—Rob Walter
Fresno, CA

Rap, rap, rap, they call it the Raptor.

Rap, rap, rap, you know what I'm after!

—Tom Page
Winchester, OR

Aah, now are you going to go ahead and have those TPS reports?—Ed.

Amazing truck! The automotive equal to an obese granny in a thong!

—Brent Fetterly
Redding, ON

When I receive a car magazine, I tear it open and start reading it. Seeing the new 2017 Ford Raptor on the cover of the last issue, I couldn't wait. I mean, c'mon, a ridiculously powerful truck that launches to 60 mph in five seconds flat?! Sign me up. Oh, wait, but that price... \$63K as tested?! For only an extended cab? If I had \$63K sitting around, here's what I'd do: Plunk down \$40,000 as a down payment on a hobby farm, another \$3000 for a ninth-gen (1992 to 1996) F-150 as my farm truck (which happens to be one of my dream cars, too), and use the leftover \$20K to get myself the new 2017 Honda Civic hatchback to use as my commuter car. Sorry, but I cannot justify blowing 63 grand on a truck that's more toy than truck.

—Markus
Bloomington, MN

You know what I would do if I had a million dollars? I would invest half of it in low-risk mutual funds and then take the other half over to my friend Asadulah who works in securities—Ed.

FIVE ALIVE

As a 61-year-old gearhead who has owned two lovely 5-series BMWs in the past, I'm shocked by Eric Tingwall's review ["Mulligan," February 2017]. The article, after some discussion of the new 3.0-liter six, says that there's just one transmission, an eight-speed automatic. That's it. Nothing more.

Why in the world would Tingwall just accept that? No third pedal on the floor in a 5-series. Auto only. Okay. No discussion? No outrage? No thought as to the fact that you can get a Honda Accord Sport with a manual?

The lack of push-back is truly remarkable. And NOT what I'd like to see from C/D!

The 5-series has been an iconic driver's car. Now no longer available with a manual. I feel like I'm in the twilight zone.

—Bill Phillips
Phoenix, AZ

Where's the damn manual, BMW?! Feel better, Phillips?—Ed.

GET UP

I find it interesting that the Maserati Levante ["Ghost of the White Dame,"

Letter of the Month:

—**RAPTOR!** VIR is gonna be pissed when the track is covered in dirt, sand, rocks, cacti, rattlers, and scorpions after the next Lightning Lap.

—Sam Carkhuff Jr.
Denver, CO

Explained:

Low- versus high-range acceleration in the Ford Raptor

I got buried in the specs page for the Raptor and was wondering if you had ever run the acceleration test on this vehicle using the low range in the transfer case. It would be interesting to see if running through seven shifts in low range to get to 60 mph was quicker or slower than the two shifts required for high range. And how much of a gain is pulled right off the line with a stronger launch. The advent of quicker-shifting and multispeed autos, together with turbo motors, is an interesting advancement.

—Chris H., Chico, CA

After we got your letter, we tested another Raptor and found that it takes an extra 1.3 seconds to hit 60 mph in low range, leading us to conclude that some of the extra time is due to shifting. Low isn't really set up for max acceleration. In low, the transmission starts in second, skips third, shifts to fourth, skips fifth for sixth, then shifts into seventh through 10th gears in sequence. It's possible to select first, but the engine bounces against the rev limiter no matter how quickly you pull the paddles. Even with first gear and low range selected, the Raptor is slower to 10 mph than it is in high, leading us to believe that torque is electronically limited in low—Ed.

February 2017] resembles a lifted Mazda 3 hatchback more than any of Mazda's own SUVs ever have.

—Andrew Terry
Pacific Grove, CA

would need to perform instrumented testing on one. We tried to get our hands on a Cayenne S or GTS for this very reason, but we couldn't—Ed.

Regarding the looks—and this applies to the Camry and the Lexus line also—Toyota is trying so hard to look different that the cars just look bizarre.

—Marshall Anderson
Corpus Christi, TX

TRENCH WARFARE

I just read your review of the Maserati Leviathan. Uh, Levante. You seem to place it at barely an honorable mention in the SUV class and compare it numerous times to the Porsche Cayenne. However, your spider graph compares the Levante to three other SUVs with no inclusion of the Porsche. How did you manage to exclude what seemed to be an obvious lead-up?

—R. Terry Basey
Monrovia, CA

To list the Cayenne as a competitor, we

Tony Quiroga's Chevy Volt vs. Toyota Prius article in February ["Tortoise and the Hare"] harked to the glory David E. Davis Jr. days of C/D, when the tests were often so lyrical they could be read with glee even by someone not interested in cars. I especially enjoyed comparing the Prius's looks to something in the Mariana Trench and sounding on broken pavement "like a street performer drumming on a plastic bucket."

I think the value of your test is that it establishes two good reasons for skipping the plug-in version in favor of the regular Prius. The first one is that, while still a bit quirky, the non-corded Prius is better-looking. As Quiroga rightly points out, color matters. We chose Sea Glass Pearl for my wife's car, a much more pleasing shade of blue. Or is it green? All I know is that when I finish washing it, I step back in admiration. The second reason to





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choose a regular Prius (Touring, in our case) is reliability. Ghost acceleration notwithstanding, Toyota is legendary for building cars that last a really long time. Buy the Volt, and there'll be no assurance that it will stay out of the shop. Besides, GM is famous for introducing cars and then pulling them off the market willy-nilly. The Prius will endure.

—Cleveland Eugene Bryant
Des Moines, IA

Has Chris Bangle landed at Toyota/Lexus?

—Wayne Leuthold
Granger, IN

Alright, Mr. The New Prius Is Ugly, what would you rather have? A Honda Element or a Pontiac Aztek? I disqualify myself 'cuz I've owned 'em both!

—Dan Jakel
Grand Rapids, MI

TESTING 1-2-3

I have never read an article as funny as Jeff Sabatini's "Non-standardized Testing" [February 2017]. I couldn't resist writing to tell you that I was getting looks from

concerned bystanders while I was laughing so hard at my desk with your magazine open. Truly amazing lines such as "you're the type of person who wastes time at work screwing around on Excel rather than Facebook" describe my nerdiness succinctly. Thank you for the good laugh, and please let him write more articles!

—Brad Ottino
Little Falls, NJ

SO CONTINENTAL

This new Lincoln Continental is an extreme disappointment ["Return Engagement," February 2017]. No car enthusiast in the 50-to-65 age bracket would even consider purchasing this rebodied Taurus [er, *Fusion*, but point taken—Ed.]. After all the hype about a true high-powered V-8, the classic "suicide door" look, and sporty handling, Ford/Lincoln produces this fiasco and expects the Chinese market to buy it. My next new vehicle in a year or so will be yet another Chrysler 300 Hemi or the newly described upcoming

"ALRIGHT, MR. THE NEW PRIUS IS UGLY, WHAT WOULD YOU RATHER HAVE? A HONDA ELEMENT OR A PONTIAC AZTEK?"



Editor's Letter:

Is anyone paying attention to the sad fate befalling the Mercedes-Benz SL? Its sales have shriveled alarmingly, and its body has been contorted into some sad parody of a rich guy's ride, a neo-Zimmer Golden Spirit for those who can't stretch for a Bentley.

This used to be the ultimate sporting gent's car and the white-hot core of its storied brand. Symbolically speaking, the SL was as important to Mercedes-Benz as the 911 still is to Porsche, as the Wrangler is to Jeep.

Throughout its six-decade-plus history, it had no peer. No other car could dispatch long distances and long sweeping curves with equal grace; sidelong competition from BMWs as varied as the 507 and the 6-series convertible couldn't unseat it as the king. And as much as it evolved—from the aero-influenced 300SL Gullwing and roadster to Paul Bracq's Pagoda speedboat to the tech showcase of the R129—the car remained true to itself: everlasting, untouchable, and perfectly ahead of its time.

Now look at it. Last year, Benz moved just 3700 SLs, compared with almost 14,000 a decade and a half earlier. Is this a case of high-personality rides such as the G-wagen and the AMG GT crowding its spotlight, or is the current SL simply a design undeserving of attention? At a time when Benz is drawing stunning sedans and building chassis that have recaptured the brand's unmistakable interplay of ride suppleness and deft handling, here's a sports car that arguably drives with the least amount of character in the lineup and looks as if it was designed by three guys who've stopped speaking to each other.

Why do I, someone who can't afford an SL, care so much about it? Why is this malaise so personally depressing? Because I still aspire to SL-ness. I've had two of the best cross-country drives of my life in these cars. The first was a Gumball 3000 that stretched from NYC to the Playboy mansion, with nothing respectable in between. The second was the 2013 Mille Miglia in a '55 Gullwing, and that trip almost caused me to convert to Catholicism. In both cases, the cars were crystalline conduits for the experience, heightening all sensations. And in both cases, other competitors asked if they could trade their exotics for our SLs. Spend a week driving a car hard and you'll know its true nature, and possibly your own.

So I've lost the car of my new-car aspirations, and I can't will myself into wanting a G-wagen. I just don't see me getting the requisite embroidered jeans and tiny dog.

—Eddie Alterman



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Imperial. Thank you, Lincoln, for making all these final efforts to promote Chrysler sales.

—Richard D. Newman
Clio, MI

There's no Imperial coming—Ed.

You conclude the review of the Continental by stating: "We're convinced that a slight change in focus and another stab at tuning could produce the first Continental that's truly at home in a car enthusiast's driveway."

Why would Lincoln want to make such a change in focus after seeing the miserable job Cadillac has done competing for sales on the enthusiast playing field with the German marques? Cadillac's efforts at wanna-be-BMWism has resulted in its generating about half the sales of the luxury-market leaders. In the Continental, Lincoln wisely has eschewed this failed formula in favor of creating an upscale sedan in the classic American tradition: large, powerful, quiet, and luxurious. Perhaps this approach will prove more effective than the Cadillac formula, which seems to be building more cramped imitations of German luxury sedans while turning its back on its traditional customer base and those who aspire to join that base.

—Mark Quinn
Naperville, IL

I do want to express myself, okay. And I don't need 37 pieces of flair to do it—Ed.

What, no suicide doors?

—James Reilly
Chicopee, MA

HATCHING

I just read the "Wear Your Flare" review of the Honda Civic hatch in the February 2017 issue and have a question: Other than feel, why would a company fit a vehicle with a CVT and have it emulate "a conventional step-gear transmission"? Is there some performance advantage, fuel-mileage advantage, or what? I have a vehicle with a CVT, and I prefer the non-interrupted power delivery.

—Phil Mortello
Show Low, AZ

They add "gears" because drivers have complained about engines that continuously drone and moan under hard acceleration—Ed.

NO WIN

Alterman, I held my breath as I started reading your Editor's Letter for February, expecting a diatribe against Trump and a trashing of those of us who voted for him, being fed up with the feds, and anxious for change. I was able to breathe, as you exhibited an uncharacteristically—for media types—reasoned assessment of a free(er) market approach under Trump. Consumers being able to buy what they want for a price they want to pay. Wow! Imagine the possibilities. Back to the future indeed!

—Rick Music
Nicholasville, KY

Mostly, *Car and Driver* articles do not make me angry. The Editor's Letter in the February issue was an exception. I strongly disagree with Alterman on many points. Here are some: First, Donald Trump is not "good at business" [sarcasm—Ed.]. He is a person of questionable talent who got lucky. Also, the CAFE standards are there for a very, very good reason. Have you ever heard of climate change? Repealing the standards would just be another step toward a climate disaster. Another point of disagreement: Alterman seems to be implying that cars would be more enjoyable if engines were bigger. No. The car of 2020 will be more like a self-driven 1976 Lincoln Continental crossover than a Plymouth Hemi 'Cuda. I'd rather have a Tesla. Another thing: Yes, I am a liberal.

—Aaron Mansfield
Columbus, OH

I'm glad that you can see the new direction of the winds of change. The Trump administration's policies will make America V-8 again! Sorry, I just couldn't resist.

—Mark Nahmias
San Tan Valley, AZ

WAGONTRAIN

Publishing a mini-retrospective on the Volvo wagon ["The Volvo Wagon," February 2017]? Good call. Failing to mention C/D's own Boss Wagon III? Facepalm.

—Paul Schuh
Silver Spring, MD



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SPARE CHANGE

Josh Jacquot's article ["Spare Change," February 2017] was helpful on two fronts. First, it'll reduce my cringing whenever a gorged minivan wearing a donut spare careens past me on the interstate.

Second, it goes back to my December 1989 drive from Pittsburgh to grad school in Arizona. Coming out of an urban reduced-speed area on I-70, I found myself side by side with a Fox-body Ford Mustang GT. I had dropped my C/D-approved 1988 Mazda 626 Touring Turbo into third gear, and I hung with the GT until sanity prevailed at 105 mph or so. That's when I noticed that the GT's right-front tire was a temporary spare. I'd always wondered about that driver, and Jacquot's article gives me hope that he likely survived until the regular tire returned to duty.

—Matt Blyth
York, PA

Always wondered about that. Thanks. So what happens when donuts are on all four corners?

—Marc Nagel
Colorado Springs, CO
Myocardial infarction—Ed.

ELECTRIC AVENUE

Robinson zaps the electric-car naysayers, turning their fossilized arguments right on their head ["Propel your car with explosions? Prepos-



terous!" February 2017]. Ingenious!

—Hal Feinberg
Camarillo, CA

Robinson's parody about introducing a new propulsion technology to the American carscape was fun to read and spot on! Every challenge we've been throwing in front of EVs is played out as he explores meeting the needs of the internal-combustion engine. We did this once; surely we can do it again. However, I confess I really enjoy driving my Scion FR-S/Toyota 86 and don't want to give that up. EVs just don't have that wonderful wail under full throttle that I love so much.

—Rod Kempton
San Diego, CA

Being an old goat weaned by the rumble of a V-8, I cannot say I'm enthusiastic about the EV mode of private transportation. However, Robinson's column in the February issue was very clever and enlightening. This is

going to be a tough transition for "old farts."

—Tom Archie
Milwaukee, WI

CHECKERED FLAG

I've taken delivery of your magazine, off and on, for 50 or so years. Tell you what, that A.J. Foyt page ["What I'd Do Differently," February 2017] is about the best you have published. One of the most straightforward, bullshit-less interviews that has ever been recorded. Merle Haggard could have a written a fine tune with that material.

—Harold Simpson
Plano, TX

REAL WORLD

If I learned anything from your February 2017 Backfires, it's that your readers are very, very picky. Month after month, you guys keep getting letters about how you always feature cars that are expensive and out of reach for the everyman. So, the month that you devote an entire issue to SUVs, the complete

vehicular embodiment of practical and inexpensive, there's an uproar about how "it's not SUV and Driver" and how the magazine that used to feature fun and exotic sports cars now displays the car enthusiast's greatest foe, the crossover. "Car" is a loose term, one that includes SUVs, and I, for one, refuse to think that you guys have lost your way just because you try to cover every aspect of the car world.

—Connor Wallans
Ottawa, ON

I'm a senior in high school, and my science score for the ACT is in the 99th percentile of all people tested. Everyone always says the science section is so hard because they can't understand the graphs. It suddenly hit me that I can read graphs so well because you guys use such funny-looking graphs in your magazine—spider graphs and Data Central. I just want to say thank you for all the ACT training you've given me. And to be honest, spider graphs aren't that hard to read. I don't know what all the fuss about them is. I love *Car and Driver*. Keep up the great work!

—Hunter Criddle
Lehi, UT

Please refresh my memory: Why do we hate crossovers and SUVs?

—Mike R.
Danville, CA

I forgot, but I recall that there was a great reason—Ed.

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Upfront



Reveal of the Month

THE FAST SHOW

McLAREN SENDS US MORE TO OGLE. *by Mike Duff*

McLAREN MARCHES TO A SPEEDY TECHNO DRUMBEAT.

It's been only six years since the company's supercar-making Automotive division launched its first product, the MP4-12C. McLaren gave that car what was essentially a heavy facelift—and a far less clunky name—just three years later, rechristening it the 650S. Now the mostly new 720S is here, based around a substantially advanced version of the 650S's carbon-fiber tub and a turned-up-to-11 twin-turbocharged V-8 mounted amidships. McLaren, a brand we don't associate with hyperbole, claims on-track performance will make that of the 650S feel almost leisurely. Certainly looks that way.

▼ CHASSIS

McLaren has stuck with commendable adhesion to the plan it announced when it launched its road-car division back in 2010. That is, to use the same core architecture to create a family of models graded thusly: entry-level “Sports,” mid-ranking “Super,” and extreme “Ultimate” series. The 720S coupe is the first of the second-generation Super Series cars, and as such brings forth a new iteration

of the company's carbon-fiber tub. The so-called Monocage II is more robust than the MonoCell of the 650S, incorporating an upper structure that integrates the windshield framework, the roof spar, B-pillar hoop, and buttresses. The upper A-pillars' moldings are sufficiently well finished that they don't need interior cladding. The roof spar includes attachments for the new wider-opening dihedral doors. The tub weighs 39 pounds less than the old MonoCell, with the car's overall weight falling to a claimed 2829 pounds.



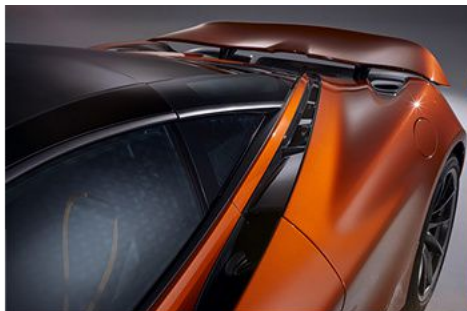
◀ MONOCAGE II

Likewise, the suspension is evolved rather than reinvented. There are new control arms and knuckles, but the 720S keeps McLaren's hydraulically linked suspension that uses hydropneumatic units to control roll. The spring rates increase by 10 percent in the front and 20 percent in the rear, with harshness mitigated by a "Proactive Chassis Control II" system that uses 21 sensors to tune ride and handling according to road conditions and the dynamic mode the car is in: comfort, sport, or track. The stability control now features a variable-drift function to turn even modestly talented owners into full-oppo driving gods.

▼ POWERTRAIN

The power figure isn't quite as impressive as the 720S's name would have you believe, as it refers to metric horsepower, which is only 98.6 percent as strong as the 'Merican kind. In the U.S., we'll call the 720S's output a still-heady 710 horsepower, accompanied by 568 pound-feet of peak torque. That comes from a concerted development of McLaren's twin-turbocharged V-8, with an increase in displacement to 4.0 liters. New turbos, cylinder heads, and pistons plus a new crankshaft enable the company to claim—with characteristic exactitude—that the engine is 41 percent new. The seven-speed dual-clutch transmission gets revised software to shift even quicker.

At lower speeds, the acceleration numbers aren't much better than those for the 650S, which was already operating at the outer edge of the traction envelope. McLaren claims a 2.8-second 60-mph time for the 720S, just a tenth quicker than its claim for the 650S. But as speed builds, so do the differences, with the 720S hitting 124 mph (200 km/h) in 7.8 seconds—



001
THAT'S NO
PHOTOGRAPHIC
TRICK. RED LIGHTS
THAT ILLUMINATE
THE ENGINE BAY
WHEN THE 720S
IS UNLOCKED ARE
STANDARD
EQUIPMENT.





002

002
THE INSTRUMENT PANEL'S TRACK MODE SUGGESTS THAT McLAREN ISN'T WORRIED ABOUT COOLANT OR OIL TEMPS. AND IT MUST EXPECT THAT YOUR RIB CAGE WILL WEAR OUT FASTER THAN THE FUEL TANK WILL RUN DRY.



ON THE WING OF LOVE

Compared with its counterpart on the 650S, the 720S's deployable rear wing is a win-win-win. When extended, it contributes to a doubling of downforce over the 650S. Stowed, it reduces drag. But our favorite feature is the fact that the wing—and, indeed, the whole car—appears to have been styled by someone with a sense of aesthetics.



003
THE MONOCAGE II SHARES ITS SHAVED DOORSILLS WITH THE 570S. THEY'RE SHAPED FOR EASIER INGRESS THAN THE 650S'S.



003

0.6 second quicker—and 186 mph (300 km/h) in just 21.4 seconds, a whopping four seconds sooner. The claimed top speed is 212 mph.

▼ STYLING

The 720S looks stunning, but it also looks different—not just from the McLaren road cars that have preceded it, but also from pretty much every other mid-engined supercar. Here's why: There's no obvious intake behind the door. "As soon as we set the aerodynamic targets for this car, we realized we could not use an intake there," says Haydn Baker, vehicle line director. "That was the challenge from day one."

The solution, as crafted by a team led by Robert Melville, McLaren's chief designer, is a particularly elegant one. Air flows to the engine and the radiators through a barely visible channel between the body side and the rear side glass. Other clever aero features include door-mounted blades to route air leaving the front diffuser, and small intakes underneath the headlamps for the heat exchangers in the car's nose. At the tail is a full-width wing that can deploy in just half a second. McLaren claims the 720S delivers 50 percent more downforce than the 650S, but with less drag when the wing is retracted and a significant 15 percent improvement in cooling efficiency.

The lack of a side intake serves

to make the 720S look longer than its predecessor, but it barely is. At 178.9 inches, it stretches just 1.3 inches more than the 650S. The two cars' wheelbases, at 105.1 inches, are identical.

▼ INTERIOR

The cabin feels more spacious than the 650S's, thanks in large part to how much easier it is to enter. As noted, the top-hinged doors open wider than the old car's dihedral doors and the sills are narrower. Once you're inside, the slimmer carbon A-pillars dramatically improve forward visibility. Design details include a TFT instrument cluster that tucks down into the dashboard to reduce driver distraction when the car is in track mode, displaying only the speed, the selected gear, and a minimalist tach.

▼ HOUSEKEEPING

We'll have to wait until closer to the June on-sale date to confirm pricing, but the buzz from inside McLaren is that the 720S will cost around \$285,000 in the unoptioned state that nobody is likely to buy it in. A Spider version will follow by 2019 and is certain to be the more popular choice. (More than a whopping 80 percent of 650S sales in the U.S. were of the open-topper.) An even faster LT variant is also a certainty. Don't expect to wait long for that one, either, as McLaren's techno pulse throbs on.

COMFORTABLY DUMB

IF THE CAR IS DOING THE DRIVING, WILL ANYBODY BE DOING THE THINKING? by John Pearley Huffman

IF THE DOMINANT NARRATIVE holds and autonomous cars do colonize our roads, there will be no more mental calculations of time, distance, and speed. No best-guessing what that idiot in the left-turn lane will do instead of turning left. Not even any more weighing whether to grind your teeth, honk the horn, or flip the bird. Which doesn't sound all bad. But will turning on an autonomous vehicle turn off a driving mind? Will relinquishing control and responsibility make us dumber?

Intelligence means different things to different scientists. It's not solely a question of whether or not self-driving cars will make us stupid, but which brain cells are threatened with dying off. Jonathan Schooler, a professor of psychological and brain sciences at the University of California, Santa Barbara, is interested in the cognitive science of how human brains work.

"It's certainly true that if people lead stimulating and complex lives, that influences the brain and influences mental development," he explains. "There's research on the complexity of occupations, people who have more complex jobs with more complex demands, and how that affects their thinking and also how that affects their aging. In general, more complex jobs will lead to greater cognitive flexibility." That extends to everyday tasks as well. So autonomous vehicles may allow us more time for contemplating the state of the universe, which would better hone the keenness of a human mind than ruminating on the injustice of this week's *Bachelorette* dismissals. But probably not.

John D. Lee, an engineer and the Emerson Electric Quality and Productivity Professor at the University of Wisconsin, Madison, also sees autonomous vehicles as a mixed bag for our minds. "The oxymoron of autonomy is that we think it reduces skill requirements when often it increases them," he says. "If it's not full autonomy, then sometimes you need to interact. We need to remain vigilant and ready to step in when necessary. Automatic makes the easy things easier and the hard things harder."

Fully autonomous vehicles will almost certainly make us more cognitively lazy about driving, and likely will effectively "de-skill" us over time so that when there's an emergency, we're incapable of saving ourselves. "Skills we don't use will atrophy," concludes Lee. "The dangerous thing is that we will lose skills that we periodically need to drive safely."

Lee suggests that driver training will need to adapt to semi-autonomy. And those technologies need to be designed to keep us sharp—not always to drive for us, but to prompt us to drive better and maybe even to offer some constructive criticism of our skills. Because while fully autonomous cars will promote complacency, the steps between here and there, if linear, "could make us much less lazy than we are today," says Lee. In other words, there's still time for us to swerve around a truly stupid future.



HIGHWAY TO THE DANGER ZONE

Not all driving is the same. The Yerkes-Dodson theory describes the relationship between psychological arousal and performance. At low levels of arousal, such as commuting, driving is a rote chore demanding minimal performance. When driving at speed or racing, the arousal level is high and performance rises with it as the task grows more complex—until it peaks. It's at this point you feel "in the zone" and ecstatic, as that peak is self-reinforcing. It's a tough edge to maintain, though. Too much arousal can push you past the Yerkes-Dodson peak and overwhelm your abilities. But that's probably not what's on your mind as the car spins into the wall.

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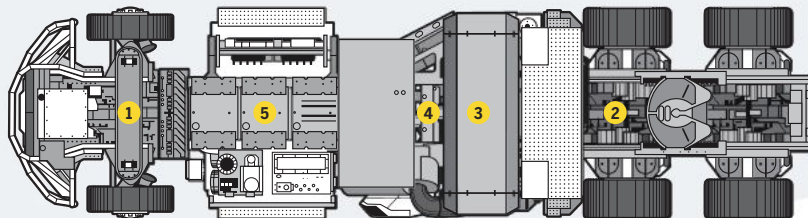
NIKOLA AIMS TO TAKE THE TESLA APPROACH LARGE-SCALE WITH A FUTURISTIC SEMI. *by Clifford Atiyeh*

TREVOR MILTON WANTS to do Elon Musk one better in the field of zero-emission transportation. With his Nikola EV semi-tractors, he hopes to disrupt the market for the largest commercial trucks on our roads, just as Tesla did for luxury sedans. His business model even borrows the inventor Tesla's first name.

But Milton, who made his fortune developing heavy-duty natural-gas powertrains, is embracing hydrogen for his Class 8 long-haul trucks. "People are taking a lot of intermediate steps, and I think that's the wrong way to do it," he said of the slow crawl toward a hydrogen infrastructure. He plans to develop a network of refueling stations along the nation's major shipping corridors concurrently with the introduction of his trucks.

Milton's Nikola One is the supercar of sleeper cabs. Four 800-volt electric motors fed by a 320-kWh lithium-ion battery, which is itself powered by a hydrogen fuel cell mounted below the frame rails, combine to shove 1000 horsepower and 2000 pound-feet of torque through a two-speed automatic transmission. With the 5000-psi hydrogen tank filled to capacity, the Nikola One can travel between 800 and 1200 miles, depending on how close the payload is to its 65,000-pound capacity. A typical diesel tractor-trailer gets between 5 and 7 mpg. Nikola claims the equivalent of 13 to 15.

All these specs exceed industry benchmarks, as does the price. At \$450,000 to \$500,000, the One would cost four times as much as the average sleeper. But that



TRACTOR DREAM

The One isn't all-wheel drive, because only one rear axle is powered. But there are two electric motors on both its front (1) and forwardmost rear (2) axles, which also enables torque vectoring. Those axles feature independent suspension, promising a smoother ride than most big rigs. The hydrogen tanks (3) sit aft of the cab, while the fuel cell (4) and the battery pack (5)—all 32,000 cells—are beneath the floor.



includes maintenance for seven years plus hydrogen for a million miles (a 7-mpg Peterbilt would burn nearly \$360,000 in diesel over that distance at today's prices). Testing starts next year, and while there's only one working prototype, Milton says he has about 8000 orders and production booked for five years starting in 2020.

Tougher EPA requirements through 2027 essentially require truck manufacturers to embrace electrification. But diesel prices—not Milton's lack of billions or his strategy to produce boundless quantities of hydrogen from solar arrays—may stop Nikola. Diesel costs around \$2.50 per gallon at this writing. Even if it rises to \$3.50—the threshold at which most large fleets would buy more efficient trucks, according to a recent University of Michigan survey—truck operators prefer more affordable upgrades such as improved aerodynamics, idle-reduction measures, and speed limiters.

There is some hope, however, in the same survey, which found that 30 percent of all operators said they would consider hydrogen and electric powertrains in the next two years. But those people might not stick around to buy once they see the Nikola's price.



SPACE TRUCKIN'

Who'd ever have thought that driving could be faster than

the internet? With enough data, it is. Amazon's Snowmobile is a 45-foot-long, 68,000-pound hard drive in a tractor-trailer. (The name is a riff on Snowball, Amazon's

large-scale data-transfer service.) For up to half a million bucks per month, Amazon will bring a trailer to you and transfer up to 100 petabytes (100 million gigabytes) to it, then

physically drive the data to Amazon's nearest cloud server. Total upload speed: less than a month by truck versus a few years over even a high-speed internet connection.

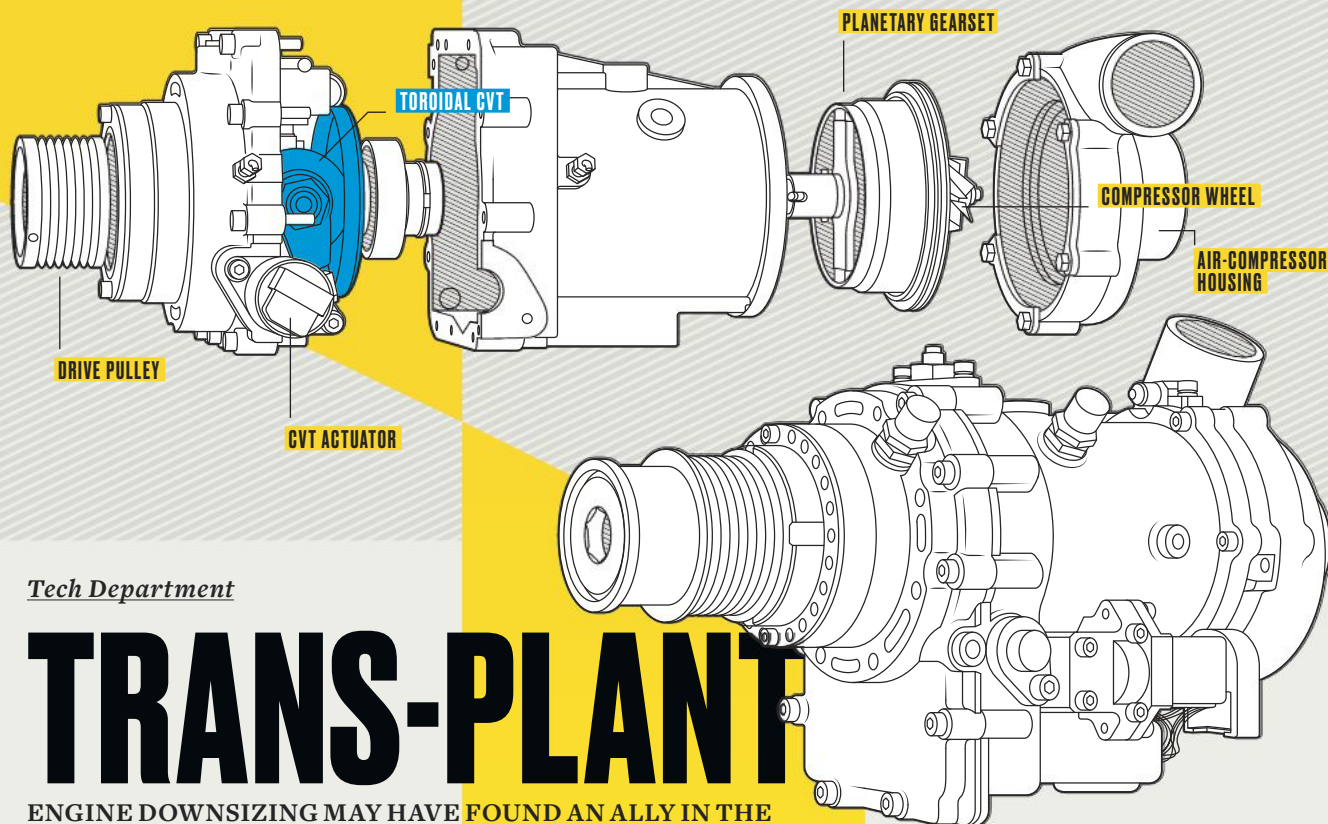
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Tech Department

TRANS-PLANT

ENGINE DOWNSIZING MAY HAVE FOUND AN ALLY IN THE LAST PLACE ANYONE WAS LOOKING: THE CVT. *by K.C. Colwell*

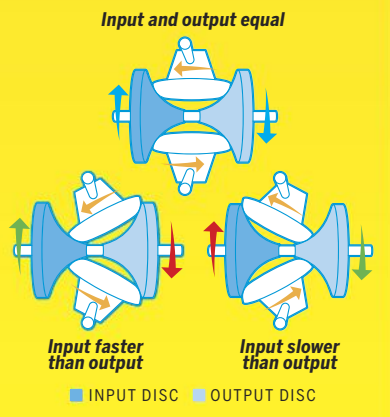
TO A MOTORHEAD, the words “continuously variable transmission” and “engine downsizing” are about as exciting as the running of the bull terriers. But with its V-Charge supercharger, Torotrak, a British automotive technology company, is hoping to change our attitude toward both concepts.

In a compact 13-pound package, V-Charge combines a belt-driven centrifugal supercharger, a planetary gearset, and a teeny-tiny toroidal CVT serving as a transmission for the supercharger itself. With its CVT’s 10.0:1 ratio spread, V-Charge can, for example, change its impeller speed from 1000 rpm to 10,000 rpm in 0.4 second, delivering what it claims is a faster torque response than a conventional clutched supercharger. This is possible anywhere in the rev range, even at the low rpm most cars turn while puttering through a city.

Unlike conventional superchargers and exhaust-driven turbochargers, both of which rely on engine speed to generate boost, the V-Charge can increase the intake-manifold pressure independent of engine rpm. Luxury brands such as Audi, Mercedes-Benz, and Porsche rely on charging technologies like variable-vane, twin-scroll, or sequential turbos to improve low-rpm responsiveness. But by abandoning the fixed drive ratio between the compressor and the accessory belt, Torotrak claims to outperform these complex boosting options with a smaller and

OILING UP FOR GRIP

Unlike a conventional CVT with a belt and pulleys, a toroidal CVT uses cone-shaped discs and pivoting rollers to achieve ratio changes. These discs and rollers don’t actually touch; they sit in a bath of oil called traction fluid, which also pulls double duty as a lubricant. Under pressure, its viscosity increases, giving the input disc the traction it needs to transmit torque through the ratio-controlling rollers and onto the output disc. Idemitsu Kosan, a Japanese oil company that makes traction fluid, says that under extreme pressure its special sauce increases its viscosity by a factor of 100 billion.



simpler package. V-Charge could be used to improve low-end response in much the same way an electrically driven supercharger does, only without an expensive 48-volt subsystem to drive the motor—its CVT actuator needs just 10 watts to work.

Because Torotrak’s V-Charge can deliver an optimized amount of air for any load situation, the system could be adapted to a wide range of gas and diesel engines. In theory, engines equipped with V-Charge could do away with or limit the use of a conventional throttle valve, as seen in diesels and some variable-valve-lift gasoline engines, further reducing pumping losses and improving efficiency. Also, the CVT minimizes the parasitic losses normally associated with superchargers, and friction losses are limited because the discs and rollers of the CVT make no contact with one another [see sidebar].

V-Charge is still incubating, but there is a lot of promise for this technology in production cars. Last May, the University of Bath, in partnership with Ford, conducted a test using a 1.0-liter EcoBoost engine that delivered more torque and at lower rpm with reduced losses compared

with the stock engine. Torotrak says the test proves V-Charge’s ability to enable radical downsizing without compromising drivability. It may just want to keep that CVT bit quiet so as not to deter enthusiasts, or maybe it should tell everyone that it stands for “continuously variable turbocharger.”



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Hankook

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ADVENTURE PHOTOGRAPHER

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challenging, but the rewards are worth it
for those willing to brave the journey.

 **Hankook**
driving emotion

When I joined C/D, I had no idea how many peculiar situations it would foist upon me. Here's one: I wrote a story about a \$105,000 SVI Raptor [August 1996]—not the Ford truck but a Chevrolet Suburban with a 420-hp supercharged 454-cubic-inch V-8.

The engine didn't make the Suburban interesting. Here's what made the Suburban interesting: Where the rear seats used to be was a General Electric product that wasn't a dishwasher. In fact, it was a GE GAU-17, which is a 48-inch swiveling machine gun capable of firing 3000 7.62-millimeter NATO rounds per minute. The weapon hung on a spring-loaded thingy that caused it to perform a jack-in-the-box through a custom sunroof. The Raptor was the creation of silver-haired Roger Harrison, former ambassador to Jordan, who had learned that King Hussein needed more security.

The Raptor that I tested right then was in transit to New York, thence to be airlifted to the king. At the end of our test, Roger said to me: "I can't take that gun to Jordan. Can you ship it back to my shop in Colorado?"

Yes, I could and would, but it meant that I was headed home that night in a British right-hand-drive Ford wagon that I was driving for some other no-doubt peculiar purpose, with a 48-inch machine gun in the cargo bay. I got as far as Chelsea, Michigan, before a Thor-like voice of doom in my head said, "What if you get stopped by a cop?" Here's what:

[COP:] (Walking up to the wrong side of the Ford, now slightly annoyed, finally locating

the correct window.) Here you are! Funny to find you in the wrong place! Do you think right-hand drive is legal?

[ME:] I don't know if it's legal. I do know that it's difficult.



[COP:] Is this your car?

[ME:] No, sir. It's Ford's car.

[COP:] Like Gerald Ford, the ex-president?

[ME:] No, sir. Like William Clay Ford. You know, Dearborn and all.

[COP:] Which of our presidents was William Clay Ford? (The cop now scans the wagon's

interior, spying the largest weapon in his experience.) So, I see you have a gun. You should have told me that straight off.

[ME:] Well, sir, it's not my gun.

[COP:] How the heck did I know you were going to say that? So, I'll bite. Whose gun is it?

[ME:] It's the king's gun, sir.

[COP:] I see. Like Elvis, the king? Martin Luther King?

[ME:] No, sir. The king. Like a *king* king.

[COP:] I'm gonna need you to step out of the car for me. Don't touch your pockets.

Harrison eventually went on to build 17 Raptors, including a version intended for the U.S. Secret Service. "But in the demo, the feeder/delinker malfunctioned," he recalls. "We sent a helicopter that returned with the part. Now back together, the

Raptor burst into flames. It's funny now."

He told me that the major hurdle in Raptor production had been GM, which kept losing his Suburbans. "I was notified that a dozen had been shipped," he remembers, "and I'd paid for them. And then the Suburbans disappeared. GM couldn't find them for 10 weeks. Finally I got a call. The cars were in Denver and would be shipped by truck to me. They didn't arrive. Instead, they were put on a train to Chicago. I was later told that GM used me as a case study in how not to ship cars."

Back in those days, Harrison was also assembling some 20 supercharged and intercooled C5 Corvettes and Impala SSs—"the one that looked like a suppository," he says, "but in stock form was considerably slower acting."

So, we've stayed friends. You never know when you'll need a diplomat. Plus, Harrison is the only man I know who was asked to leave Elon Musk's SpaceX offices in California. "Elon said that his goal was to colonize Mars, which he would subdivide into parcels to be sold off. I told him my choice would be a parcel to locate a travel agency selling tickets back to Earth. Elon cut me off, asked what I wanted. To invite him to a conference, I said. He didn't do things like that, he said. He was a rocket engineer. Plus, he didn't go anywhere he couldn't make money, and if there was nothing else... Well, he left. And so I contented myself wishing for the failure of all of his enterprises."

Harrison is now 73, 61 days older than Mick Jagger, as he likes to say, and is a professor emeritus at the Air Force Academy, where Mick is not. During his three years in Jordan, two assassination plots unfolded against him. On a beach in Aqaba, he taught Queen Noor to play blackjack. He is the only man I know who met Charles Lindbergh. He is the only man I know who worked on the White House staff. And he is the only man I know who fabricated a baby seat "from steel piping covered in vinyl and kept in place by friction."

Readers sometimes write to ask why life at C/D seems weird. That's why. ■

John Phillips

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The headquarters of the 100-year-old National Automobile Dealers Association, with its 16,500 member dealerships representing 1.1 million employees, perches on a hill in Tysons, Virginia, on the outskirts of Washington, D.C.

It's an otherwise nondescript rectangle of coffee-colored glass except for three giant concrete silos arrayed along the southwest face that look like Kansas grain elevators. That odd architectural choice, along with the commanding location, perhaps makes it a navigation beacon for Marine One, the president's helicopter. When I worked there years ago, it rattled the panes almost daily as it clattered over.

I both met my future wife and became a magazine writer the day I walked into 8400 Westpark Drive on a muggy July Monday in 1994, the newly minted associate editor for *Automotive Executive*. The association's now deceased house magazine had such a quaint title, evoking images of dashing young chaps in smart double-breasted flannel steering happy couples into new Fairlanes and Chieftains. By the time I arrived at NADA, many of those young fellows were multimillionaire owners of large dealership groups with hundreds of employees, hundreds of millions in sales, and acres of prime commercial real estate. I knew nothing about them beyond the stereotypes of shakedown artists in polyester, but in my three years at NADA, I learned much.

I learned that like all stereotypes, there were kernels of truth behind this one; such as the time a photographer at one of the annual NADA conventions I covered told

me he had a shot of members throwing dice in a hotel stairway. But I also learned that auto retail is an intensely complex business whose successful practitioners are virtuosos of entrepreneurship. You see, while most small-business owners have only one type of trade to think about, a typical franchise car dealership has at least five separate businesses under one roof, including new-car sales, used-car sales, parts, service, and finance, each with its own distinct reams of federal and state regulations and its own unique way of losing lots of money quickly through ineptitude by the department manager. If the dealer has a body shop as well, that's yet another enterprise and one that throws you into the embrace of those friendly, charitable guys in the insurance industry. And in the vast majority of places that don't have blue laws restricting weekend trade, it all runs down to dark, six or seven days a week.

I learned that auto retail is an unnervingly cash-intensive business. While covering the massive daily overhead of the facility, the equipment, and the staff, dealers lay out millions of dollars for new-car inventory from the manufacturers and typically finance it through the automaker's captive lender, paying an interest rate or "floorplan" on each vehicle until it sells, while also stocking the used-car lot with trade-ins and auction buys. Dealers know

that if your lot isn't overflowing with vehicles, you don't sell as many because buyers don't like to wait. Yeah, car-company execs sometimes talk a big game about factory stores à la Tesla, but they love the fact that the dealers, not the factory, carry the huge costs of the unsold inventory.

And while they are hourly paying out, dealers are often waiting to be paid on sales contracts by the lenders who finance the deals and who can run on their own leisurely schedules. A dealer once told me that so much cash is in transit every month, flowing in and out, that the difference between solvency and bankruptcy can be but a few days at the end of the month.

I learned that because the margins on new cars are so slim, today averaging less than 4 percent, the majority of dealers make most of their money on used cars and what's called the "back end," or financing, parts, and service. I watched dealers paying for the mistakes of others as car companies leaned on them to swallow truckloads of sales losers by threatening to shortchange them of supplies of the popular models.

Every so often, a new factory exec showed up keen to make a mark by slashing costs. They'd unleash spot audits meant to squeeze the dealers on finance or warranty work, resulting in "chargebacks," or demands that the dealer reimburse the automaker for deals or warranty jobs rejected after the fact. The automakers would also try to chisel dealers by trimming warranty reimbursement, saying that a CV-joint job once billable for four hours' labor was now only billable for three. And when the big recalls happen but replacement parts are scarce, guess who gets to face the mob of angry owners?

And along you come, intent on buying this month's new cute-ute and armed with a stack of internet printouts. You've got your financing already lined up, you want the sun and moon for your hooptie trade-in, you want the invoice price, you're willing to walk away over \$50 to a competitor, and you wonder why the dashing automotive executive behind the desk looks exhausted. Well, working at NADA, I learned why. ■



Aaron Robinson

Every so often, a friend of mine will solicit my opinion on heavy-duty pickup trucks, thus launching me into the type of sermon normally associated with people who wear sandwich boards and really want you to know that an alien named

Xinpuu is stealing the fiber out of your breakfast cereal. Personally, I think most heavy-duty-truck buyers are needlessly flagellating themselves with a clumsy ride and barbaric fuel economy when their actual towing and hauling needs could be met by a minibike pulling a Radio Flyer. I understand that we all like to be prepared, but there haven't been too many times a neighbor has knocked on my door and asked if I could help tow 30,000 pounds over the Continental Divide.

So I advocate for the lesser trucks, a philosophy that took root during my formative years, when my father regularly towed a 4000-pound lobster boat with a woefully outmatched slant-six Dodge Ram 150. It would've had a hard time towing a lobster up a boat ramp, never mind a lobster boat. But with creative use of the clutch pedal and a healthy confidence in Lee Iacocca's 7/70 warranty, my father proved that a tow rating is whatever you decide it is. If he'd bought a Ram with the 318 V-8, he probably would've taken freelance work pulling Arleigh Burke-class destroyers into dry dock at the Bath Iron Works.

Naturally, this leads me to the new Ford F-350 Super Duty diesel. With its 440 horsepower, an exhaust brake, and axles slightly thicker than the Doric columns of the Parthenon, I figured the Super Duty would prove my thesis that modern heavy-duty trucks have outgrown any practical application. Ford rates the fifth-wheel towing capacity of certain F-350s even higher

than the 27,500 pounds the factory-option fifth-wheel hitch can handle. Case in point: I have a boat, and the F-350 could tow 10 of my boats at once.

Nonetheless, I decided to see what I could do to stress it. I rented a 3000-pound hydraulic dump trailer and filled it with 10,000 pounds of gravel. (Why do I need so much gravel? Mind your own business.) The tires on the trailer looked as if they might pop, but I didn't even bother to put the F-350's transmission in tow mode. When you've got 925 pound-feet of torque, every mode is tow mode. The F-350 was predictably unperturbed and, short of completing a course at Krazy Karl's CDL Kollege, I didn't see what else I could prove. But then I remembered the stump.

During Hurricane Matthew, a tree came down across my driveway. I'd hacked away at it with my Stihl, but the stump remained in the ground. And aren't we always talking about torque in terms of stumps and the pulling thereof? Surely the excision of this remnant root would be a foregone conclusion, but I figured I should tackle it while I had Bigfoot Jr. at my disposal.

I wrapped the stump with a tow strap rated for 20,000 pounds, hooked up the F-350, and inched away in low-range four-wheel drive. The strap tightened, I eased onto the accelerator and... three and a half tons of Ford strained the tether but went

nowhere. So I gave it more right pedal and promptly snapped the strap.

Sensing that this could get dangerous, I gave up and hired a professional arborist. Kidding! I doubled up the tow straps and started making running starts. But even with the rear diff locked, the F-350 would hit the end of its leash, lurch to a halt, and start digging holes with all four tires while the stump, evidently through-bolted to the Earth's mantle, refused to budge. As a crowd of neighbors gathered, I fetched my chain saw and severed any remaining bit of aboveground root structure. Chain saw, forestry, diesel 4x4—this whole situation was so manly that I spontaneously grew a mustache and mentally canceled the luxuriant bubble bath I'd planned for later.

Last-ditch prep work done, I backed up bumper-to-stump and gave it one last shot. The big red truck once again ran out of slack, but this time a sharp crack issued

from back at the stump and the F-350 clawed forward another six inches, then a foot, and then suddenly I was off, dragging a 300-pound hardwood carcass. Now, instead of an ugly stump on my property, there was a handsome bomb crater surrounded by a

crosshatch of deep tire ruts.

I suppose some people appreciate the assurance of knowing that their vehicle is operating within its intended design parameters. Not me. I like to push the envelope, skating the ragged edge of physics, metal fatigue, and common sense. It's nice to know that there are still unwise challenges out there, even for the mighty F-350, which, come to think of it, could probably use a little more torque. ■



WHATEVER THE F-350'S TOW RATING, ITS STUMP RATING IS EXACTLY ONE.

Ezra Dyer

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Surround Vision	YES	NO	NO
Safety Alert Seat	YES	NO	NO
Lane Change Alert	YES	NO	NO
Low Speed Forward Automatic Braking	YES	NO	YES
Rear Park Assist	YES	YES	NO

CHEVROLET



Pretty

After more than two years turning on auto-show stands, the **2017 Ford GT** finally shows us what it can do to our internal organs when it turns a wheel under its own power.
_by Eric Tingwall
_photography by Greg Pajo



Sick







Lap after lap, Scott Maxwell gnaws deeper into the curbing. By drawing a straighter line through a shallow chicane on the road course that lies in the shadow of Las Vegas Motor Speedway, the Canadian pro driver with class wins at Sebring, Daytona, and Le Mans is searching for—and finding—more speed. What started as a nibble is now a chomp as he rides to the top of the red-and-white candy cane on his fourth lap. The 2017 Ford GT he’s piloting, the car in which I’m riding shotgun, swallows it whole.

The GT skates over the pavement, clearing it by just 2.8 inches in its ground-sucking track mode, when the Michelin Pilot Sport Cup 2 tires are sunk into the wheelwells and the GT looks as if it has all the suspension travel of a bobsled. Yet this carbon-fiber dart from Dearborn never threatens to lose traction, to pitch left, or to unsettle as it leaps off the curbs. It soaks up the input gracefully, presses rubber into earth, and rockets ahead. “I kept expecting that curb to launch us,” Maxwell says during the cool-down lap. “But the car just takes it.”

Back in the pits, Jamal Hameedi, the chief engineer of Ford Performance, wants my feedback. “How was it? Did you feel something more visceral than in a McLaren?”



When raised, the rear wing is more effective than it is pretty. Oddly, the prettiest pieces of this carbon-fiber car might be the cast aluminum door hinges.

No amount of poise can neutralize the effects of cornering, braking, and acceleration with that kind of intensity. I feel as if my gut has been run through a Vitamix and is now sweating out through my palms. So, yeah, the GT stirred something inside me.

After two years pirouetting on auto-show turntables, the Ford GT is finally making its own moves. Ford won't let us behind the wheel just yet—at least not while the car is moving—but in between in-depth discussions with Hameedi, I was treated to 647-hp chest compressions and gut-punch lateral g's in the passenger's seat, with Maxwell and vehicle dynamics development engineer Murray White taking turns driving.

Hameedi talks about the GT program like a man who's gotten away with something, and not just that he was able to buy a Ferrari 458 Speciale and a McLaren 675LT on Ford's dime. For competitive analysis, you understand. The guy responsible for all of Ford's performance variants, from the flying F-150 Raptor to the \$40,000 350-hp Ford Focus RS, still marvels that his team was allowed to build a car this extreme. A career Ford engineer, Hameedi knows a thing or two about corporate bureaucracy. As the program manager for the 2005–06 Ford GT, the original mid-engined GT40

nostalgia trip, he witnessed firsthand the internal resistance to selling a six-figure Ford. That those GTs now trade for more than \$300,000 (they originally retailed for \$139,995) allowed his team to shoot for the moon this time around. "That car gave us the confidence to do this car," he says.

To recognize the 50th anniversary of Ford's Le Mans podium sweep, Dearborn was wont to do a special-edition road car. But instead of some paint-and-tape Mustang, Ford Performance unleashed both a full-fledged GT racing program and a homologation road car that's pretty close to being the 2016 Le Mans GTE-Pro class winner with a license plate. The resulting production model isn't just radical for a car wearing a Blue Oval badge, it's the razor's edge of automotive design, with a weight-to-power ratio of roughly five pounds per horsepower to back it up.

Based on the neo GT's \$450,000 starting price, you might say the confidence borders on hubris, though. The GT lies in the largely uncharted waters between million-plus-dollar hypercars from Bugatti and Pagani and the supercar stalwarts from Ferrari and McLaren that run around \$250,000. The \$424,845 Lamborghini Aventador S is the only competitor parked at the same intersection of price and performance. Yet in this realm, a car is only overpriced if it doesn't sell, and the first 750 GTs—three years' worth of production—are already claimed. Ford will accept another round of applications for the remaining 250 cars in early 2018. Start building your case now; a social-media following helps.

It can't hurt that the GT looks like a carbon-fiber crystallization of the Kama Sutra. The design studio offered three initial concepts, but the development almost

immediately converged around the sketches that spawned the car you see here. "We wanted to make the air flow," says Hameedi. "And everything else followed after that." It starts with a front end inspired by the "keel-suspension" designs found in Formula 1 and Le Mans prototypes. Like those racers, the GT uses unusually long lower control arms to move the attachment points inboard while the springs and dampers are packaged inside the car's body and actuated by pushrods. This leaves gaping voids on either side of the radiator to move air through the body to generate downforce.

Designers sculpted the cockpit with an extreme front-to-rear taper that keeps airflow adhering to the fuselage without becoming turbulent. The cockpit's teardrop shape also dictates that the seat bottoms are bolted to the carbon-fiber tub with the driver and passenger seats just a few inches apart.

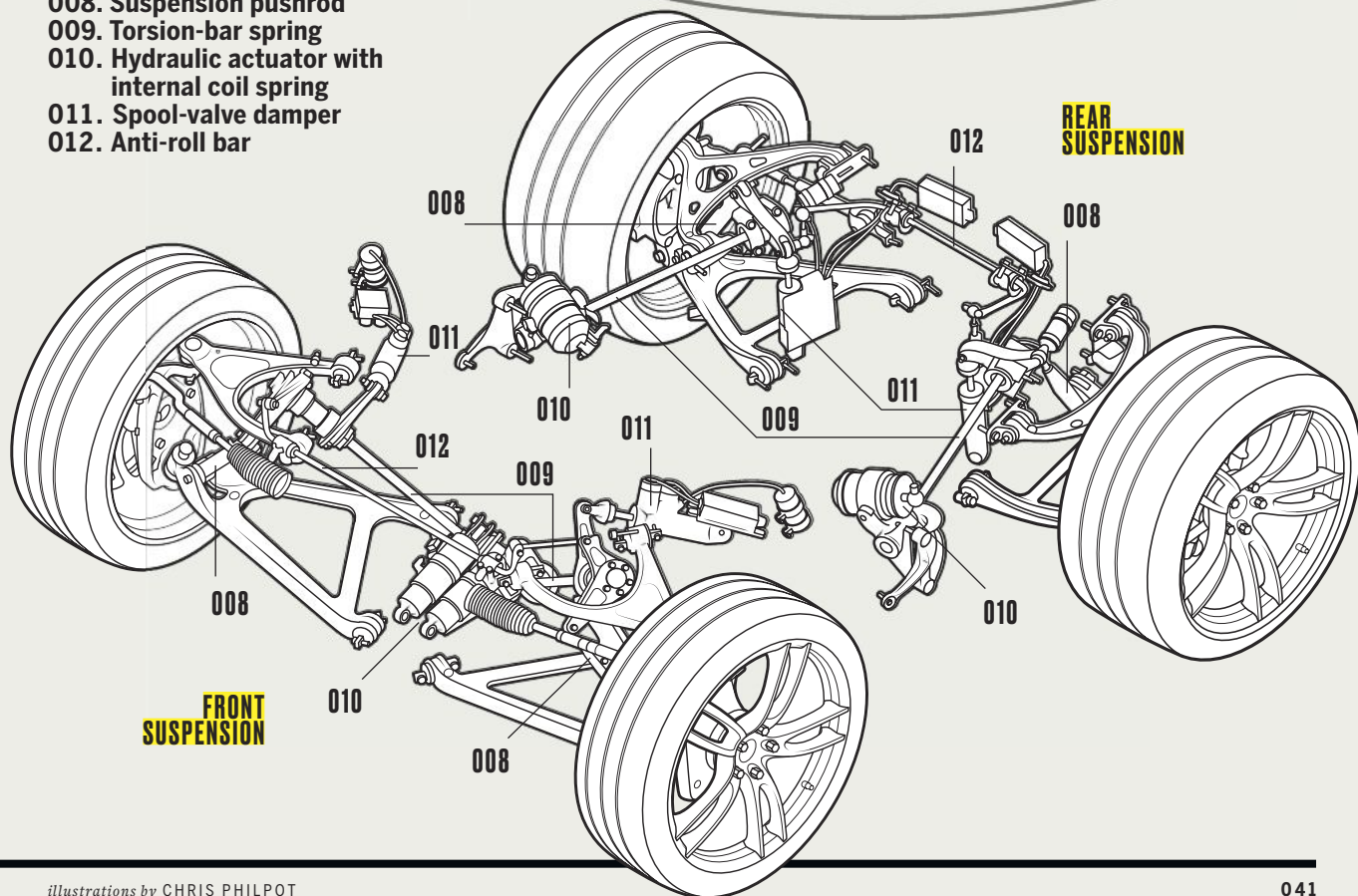
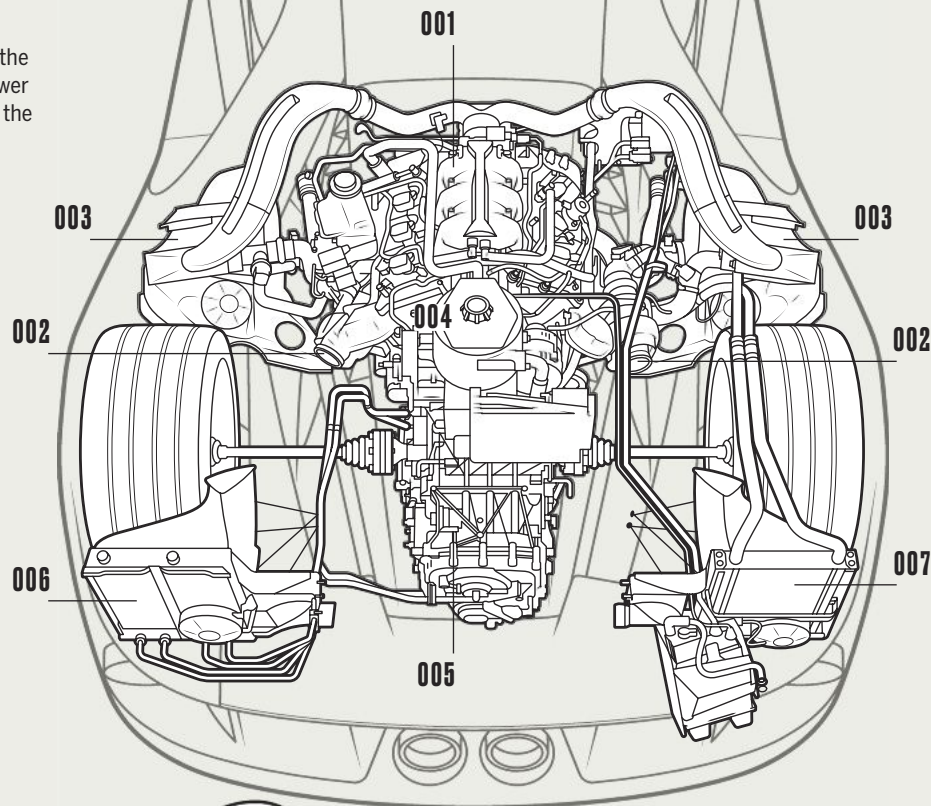
The skyscraping wing/airbrake rolls out a Gurney flap from its trailing edge when deployed, while a pair of active shutters stalls air over the front splitter to balance the total downforce. Hameedi won't cite exact numbers for the GT's performance in that area. He figures that data would allow the competition to make an easy extrapolation to the race car. "We still want to win some more races," he says.

Both Maxwell and White extol the benefits of the GT's down-

Explained: Rarefied air

Automotive engineering and design are rarely as intertwined as in supercar development, where stratospheric speeds and mid-mounted engines elevate the importance of moving air over, through, and to the right places. Notice how the GT's front lower control arms nearly meet in the center of the car. Along with moving the dampers and springs upward and inboard, this creates large channels to move air through the body with minimal disturbance, reducing lift. At the tail end of the GT, the wing and diffuser perform the bulk of the aero work while airflow through the body feeds the engine and its heat exchangers. The transmission and oil coolers aft of the rear wheels rely on air scooped from the car's underside, and they exhaust it, cleverly, through the centers of the GT's round taillights. —ET

- 001. 3.5-liter V-6
- 002. Turbocharger
- 003. Intercooler
- 004. Oil reservoir
- 005. Seven-speed dual-clutch transaxle
- 006. Transmission coolers
- 007. Engine-oil cooler
- 008. Suspension pushrod
- 009. Torsion-bar spring
- 010. Hydraulic actuator with internal coil spring
- 011. Spool-valve damper
- 012. Anti-roll bar





force as they lap, but those virtues aren't as tangible from the passenger's seat. It's the unconventional suspension and its efficacy that are rewiring my brain. There are no coil-overs. Instead, at each corner, the suspension pushrod transfers the lower control arm's movements to a rocker arm that connects to the damper and anti-roll bar while also twisting a splined torsion-bar spring [see sidebar]. The opposite end of the torsion bar, instead of being fixed to the body, attaches to a hydraulic actuator that contains a small coil spring, allowing Ford to vary the spring rates depending on the driving mode. Acting in series with the torsion bar, this coil provides a softer overall spring rate in the car's wet, normal, and sport modes than the torsion bar alone provides.

The hydraulic actuator comes alive in the track and V-max modes, compressing the coil spring and dropping the car two inches. In these settings, the coil is locked out, increasing the overall spring rate. Push the button to confirm, and the suspension doesn't deflate as in an air-spring car; rather, it pops into a squat abruptly, a Le Mans racer dropping off its air jacks in the pits.

Multimatic, the Canadian supplier and composites expert that builds the GT in a suburb of Toronto, supplies the spool-valve dampers that deftly blend compliance and control. These devices offer finer tuning precision than the stacked shims that control

If you get close enough, headlights become art. These are the standard aluminum wheels. A set of optional carbon-fiber wheels shaves 20 pounds total.

damping rates in a traditional damper, and for the first time they are electronically adjustable via a rotating sleeve that opens and closes certain tailor-shaped ports in the spool valve.

The twin-turbocharged 3.5-liter V-6 is a close relative of the 450-hp version in the F-150 Raptor. Engineers unlocked another 197 horsepower with a lower 9.0:1 compression ratio, larger turbochargers, and new manifolds, while a dry-sump oiling system keeps it all lubricated on the track. Engineers also relocated the alternator and air-conditioning compressor to the back of the engine to locate it closer to the firewall, shifting the center of gravity and reducing the polar moment of inertia.

The EcoBoost engine sucks in clean air from the lower portion of the side pods ahead of the rear wheels. The turbos pressurize the intake charge up to 30.0 psi and pass the air back to the side pods, where it climbs through the intercoolers and is piped through the buttresses toward the roof, then down into the intake plenum. Both port and direct injection deliver the fuel.

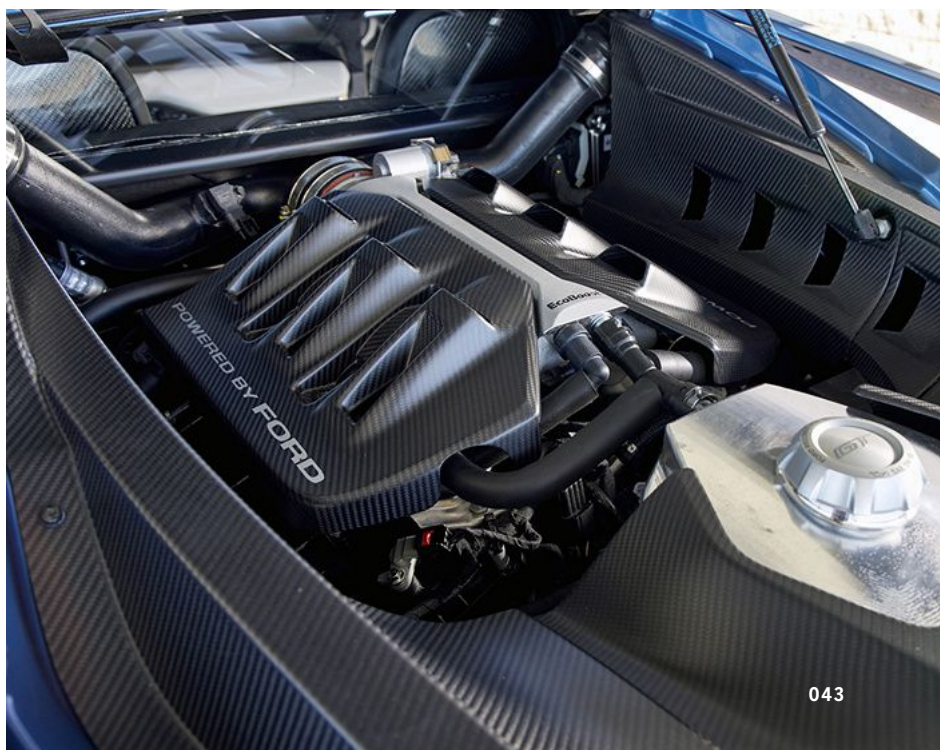
The big blowers mean that the peak torque of 550 pound-feet arrives at a very lofty, un-turbo-like 5900 rpm. To keep the turbos

“While the GT’s V-6 delivers supercar thrust, a car with looks and moves that can snap necks deserves the aural drama of eight, 10, or 12 cylinders.”



on call when the driver lifts off the accelerator, Ford activates an anti-lag system in the sport, track, and V-max modes. By continuing to pump some air through the engine, the turbos turn at about 20,000 rpm off throttle. At full boost, they pinwheel at up to 80,000 rpm. That anti-lag system is just one indicator that Ford prioritized Boost well ahead of Eco with this engine. The other telltale: the GT’s gluttonous EPA combined rating of just 14 mpg, only two ticks better than the naturally aspirated V-12 Aventador S.

While the GT’s V-6 delivers supercar thrust, a car with looks and moves that can snap necks deserves the aural drama of eight, 10, or 12 cylinders. The EcoBoost engine’s unadulterated audio—there are no exhaust butterflies or stereo supplements—is loud and deep, but it’s a thrum, not a bark or a scream, with no fire and brimstone raining from the exhaust. The





They look like Italian easy chairs from the 1950s, but the GT's seats are actually comfortable. Not all the GT's controls are on the steering wheel.

GT's engine sounds awesome for a V-6 Fusion but restrained for a 647-hp supercar. That's the downside to making your power with six pots muffled by two turbochargers, but Ford landed on that configuration, it says, specifically for the fuel-economy benefit in the race car. And, no doubt, the

marketing traction the EcoBoost association buys.

The road car routes torque to the rear wheels through a Getrag seven-speed dual-clutch transmission and Torsen-style limited-slip differential. In manual mode, cogs are swapped via milled-aluminum shift paddles inspired by the Daytona prototypes in which Ford developed the GT racer's engine before the rest of the car was finished. The stack of slots in the paddles and the vertical ridge on their backsides add tactility and grip. Launch control—activated from the top line in the digital instrument cluster's menu—cues the engine at roughly 3000 rpm and should send the 3250-pound GT to 60 mph in under three seconds. With V-max mode retracting the wing and opening the two flaps at the back edge of the front splitter to reduce drag, this carbon-fiber wonder ran a claimed 216 mph at Porsche's Nardò test track in Italy.

Today we'll top out at 135 mph while driving around what White, the chassis engineer, calls a "little Mickey Mouse point-and-shoot thing." The road course at Las Vegas Motor Speedway is utterly flat, a go-kart track on a grander scale. Nevertheless, in a Ford GT, the thrills are more Space Mountain than Dumbo the Flying Elephant.

White bends the squared-off steering wheel into each turn with a single smooth input, exhibiting the confidence of a man who knows his machine intimately. His movements become the GT's movements through a hydraulically assisted rack-and-pinion steering system with a fixed, 14.8:1 ratio. Over and over, he wheels the car toward the apex, then coaxes the throttle to deliver midcorner rotation in a brief, tightly controlled drift. Not showy, but playful.

As White tucks into the right-handers, I watch for his elbow to

2017 FORD GT

VEHICLE TYPE: mid-engine, rear-wheel-drive, 2-passenger, 2-door coupe

BASE PRICE: \$450,000 (est)

ENGINE TYPE: twin-turbocharged and intercooled DOHC 24-valve V-6, aluminum block and heads, port and direct fuel injection

DISPLACEMENT: 213 cu in, 3497 cc

POWER: 647 hp @ 6250 rpm

TORQUE: 550 lb-ft @ 5900 rpm

TRANSMISSION: 7-speed dual-clutch automatic with manual shifting mode

DIMENSIONS

WHEELBASE: 106.7 in

LENGTH: 187.5 in

WIDTH: 78.9 in

HEIGHT: 43.7 in

PASSENGER VOLUME: 43 cu ft

TRUNK VOLUME: 0.4 cu ft

CURB WEIGHT: 3250 lb

PERFORMANCE (C/D EST)

ZERO TO 60 MPH: 2.9 sec

ZERO TO 100 MPH: 5.7 sec

1/4-MILE: 10.6 sec

TOP SPEED: 216 mph

FUEL ECONOMY

EPA COMBINED/CITY/HWY: 14/11/18 mpg

jab my bicep, but it never happens. The GT's cockpit is compact but not unlivable. The passenger's seat sacrifices legroom to a shoebox-sized insert in the footwell intended to control the passenger's movements in unbelted crash tests. On the other side of the car, though, the steering wheel and pedals offer manual adjustment beyond my six-foot, three-inch frame. Pull the small fabric loop by your right knee and the spring-loaded pedal box slides toward the driver, or away from you if you stand on it. Headroom, especially with a helmet, is in shortest supply, although you can compensate with the generous amount of recline adjustment in the seatbacks.

Faux suede with splashes of aluminum and carbon fiber bathes the interior. The gear selector and headlight, window, mirror, and lock controls are the only visible pieces pulled from the corporate parts bin, and the Sync 3 infotainment system plays through a 6.5-inch screen. The sole volume control is on the steering wheel. Ford expects GT buyers to be more interested in the fact that an FIA-approved steel roll cage is sandwiched between the carbon-fiber exterior and the interior trim in every car, and that the mounts for six-point harnesses are installed at the factory. The firmly padded carbon-fiber Sparco seats look retro, as if they were sculpted in the mid-1950s and upholstered in the '70s, but they're reasonably comfortable and wider than what we've come to expect from this kind of exotica.

Six-piston monoblock calipers clamp the carbon-ceramic brake rotors up front, with four-piston units out back. White and Maxwell both gush about the binders—they're constantly pushing deeper into the braking zone, they say. After braking early on the front straight two laps in a row, Maxwell pushes too deep the next time around and gets on the left pedal late. He catches the car in speed-scrubbing oversteer. The next lap, he repeats his mistake but dumps speed into a front-end push.

Maxwell toys with that balance in every other corner. Driving fluidly but constantly feathering the throttle in turns, and making microadjustments to the steering, he rides the limits without holding back. He appears challenged but in control, and wholly engaged. The Ford GT is a beast of brute force and a clockwork of rare nuance.

My attention only wanders from the windshield for a few seconds at a time. The GT's brakes throw me into the harness. The tires shove me into the Sparco's bolsters. And the twin turbochargers punch my spine as Maxwell lines up a straight shot through the chicane. I desperately want to be in the driver's seat. The fact that I'm not is really what's making me sick. ■

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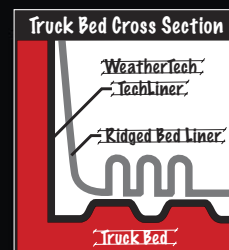
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MERCEDES-AMG E43 4MATIC
Price: \$91,175 • Power: 396 hp
Torque: 384 lb-ft • Weight: 4287 lb
0-60 mph: 4.2 sec

JAGUAR XF S AWD
Price: \$77,535 • Power: 380 hp
Torque: 332 lb-ft • Weight: 4271 lb
0-60 mph: 5.0 sec

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BMW 540i

Price: \$82,610 • Power: 335 hp
Torque: 332 lb-ft • Weight: 4071 lb
0-60 mph: 4.7 sec



AUDI A6 3.0T QUATTRO COMPETITION

Price: \$72,175 • Power: 340 hp
Torque: 325 lb-ft • Weight: 4242 lb
0-60 mph: 5.2 sec

ONE STEP DOWN FROM THE KING-OF-THE-HILL SUPERSEDANS, THIS COLLECTION OF FIVE SOCIAL CLIMBERS' SPORTS SEDANS AIMS TO OFFER A BALANCE OF BOARDROOM REFINEMENT AND BACKROAD FROLICSOMENESS, AS WELL AS AN ALTERNATIVE TO THE SUV HOMOGENY.

—by Tony Quiroga —photography by Marc Urbano



S

port-utilities have been eating into the premium-mid-size-sedan market share for years, but even though these sedans are outsold by their SUV counterparts two to one, the upscale three-box isn't dead just yet. It still accounts for nearly 190,000 annual sales in the U.S. and the players are almost too numerous to compare. Almost.

So, before the four-door sedan goes the way of the sedan chair, we thought we'd investigate the proliferation of turbocharged and supercharged six-cylinders in the premium-mid-size-sedan segment. Much sportier than an SUV, these cars ideally blend luxury vibes and sporting driving dynamics into a perfect daily driver. Winning this test comes down to how well a car balances each side of that ledger.

Eight candidates met our initial criteria, though we decided that Lincoln's new Continental is more of a luxury car than a sports sedan. The Genesis G80 Sport, a G80 with the larger G90's 365-hp twin-turbocharged V-6, would likely have played well here, but it doesn't go on sale for a few more months. Of the six that remained, there are only five in this test: We asked for a Maserati Ghibli at the eleventh hour, and the only one available (a loaded S Q4 touching \$100,000) was deemed too expensive.



Of the five competitors, one of the newest is the 396-hp Mercedes-AMG E43 4MATIC. Based on the new E-class, the E43 occupies the divide between the 241-hp turbocharged four-cylinder of the E300 and the 603-hp twin-turbocharged V-8 in the E63 S. An E43 begins at \$73,325, but our test car tallied up a test-high tab of \$91,175. Of that total, we could easily have eliminated \$7830 by forgoing the optional Cardinal Red paint, metallic interior trim, blacked-out exterior trim, ventilated front seats, AMG steering wheel, and the Burmester stereo. None of these extras increases the E43's inherent appeal, and none of them alters the driving experience.

At the other end of the price scale is the Audi A6 3.0T Quattro. Undefeated in its previous two comparison tests, the A6 underwent a mid-cycle refresh for 2016 that brought new front and rear fascias, Apple CarPlay compatibility, and in-car Wi-Fi. New for 2017 is the Competition package that brings a sport suspension, a torque-vectoring rear differential paired with wheels and tires borrowed from the S6, seven extra horses for the supercharged V-6 (for a total of 340), and the interior and exterior flair of the S6. In fact, we debated including the

Crossover sport-utility vehicles might have stolen the sales thunder from sports sedans, but that does nothing to lessen our affection for the class.

450-hp V-8-powered S6, which can be had for less than \$80,000, but decided to keep the test to six-cylinder models. While the A6 is beginning to feel its age, forgoing the S6 makes the Audi the least expensive car in this melee, with an as-tested price of \$72,175.

No test of this segment would be complete without a BMW 5-series. Redone for 2017, the seventh-gen 5-series now goes by the internal code G30 and, in 540i guise, features the latest BMW inline-six, the 335-hp single-turbo B58. The 540i's starting price is the lowest of the group at \$57,445, but piling on the packages and individual options inflates the price to an as-tested \$82,610. As with the Mercedes, it's fairly easy to bring down the Bimmer's sticker by skipping extras such as the \$4200 Bowers & Wilkins audio system, \$750 remote-control parking, \$650 ceramic controls, and \$600 soft-close doors. And we'd happily save the \$190 it costs to make it possible to wave your hand at the instrument panel to adjust the volume.

Redesigned last year, the Jaguar XF now finds itself in its first comparison test. The second-gen XF bears more than a passing resemblance to its predecessor, but it's the Jag's aluminum-intensive unibody that's unique in this segment. We do find it a bit strange that the liberal use of aluminum doesn't extend to the XF's steel doors and trunklid. Under the hood is a supercharged 3.0-liter V-6 that's basically the brand's V-8 engine minus a couple of pistons. To fight the good fight, Jaguar sent us the XF S with all-wheel drive. In S guise, the output of the V-6 rises from 340 horsepower to 380. All in, our XF S ran \$77,535.

And finally, a fair look at this segment would have to include the Cadillac CTS V-Sport. A former 10Best winner and the most



	2017 AUDI A6 3.0T QUATTRO COMP	2017 BMW 540i	2017 CADILLAC CTS V-SPORT	2017 JAGUAR XF S AWD	2017 MERCEDES- AMG E43 4MATIC
PRICE AS TESTED	\$72,175	\$82,610	\$75,885	\$77,535	\$91,175
BASE PRICE	\$68,550	\$57,445	\$61,690	\$67,195	\$73,325
DIMENSIONS					
LENGTH	194.2 in	194.6 in	195.5 in	195.0 in	194.6 in
WIDTH	73.8 in	73.5 in	72.2 in	74.0 in	73.2 in
HEIGHT	57.8 in	58.2 in	57.2 in	57.4 in	57.0 in
WHEELBASE	114.6 in	117.1 in	114.6 in	116.5 in	115.7 in
FRONT TRACK	64.1 in	63.0 in	61.4 in	63.2 in	64.1 in
REAR TRACK	63.7 in	63.9 in	61.7 in	62.8 in	62.9 in
INTERIOR VOLUME	F: 51 cu ft R: 46 cu ft	F: 55 cu ft R: 44 cu ft	F: 55 cu ft R: 42 cu ft	F: 55 cu ft R: 45 cu ft	F: 52 cu ft R: 46 cu ft
TRUNK	14 cu ft	19 cu ft	14 cu ft	19 cu ft	13 cu ft
POWERTRAIN					
ENGINE	supercharged DOHC 24-valve V-6 183 cu in (2995 cc)	turbocharged DOHC 24-valve inline-6 183 cu in (2998 cc)	twin-turbocharged DOHC 24-valve V-6 217 cu in (3564 cc)	supercharged DOHC 24-valve V-6 183 cu in (2995 cc)	twin-turbocharged DOHC 24-valve V-6 183 cu in (2996 cc)
POWER HP @ RPM	340 @ 6500	335 @ 6500	420 @ 5750	380 @ 6500	396 @ 6100
TORQUE LB-FT @ RPM	325 @ 2900	332 @ 1380	430 @ 3500	332 @ 4500	384 @ 2500
REDLINE/FUEL CUTOFF LB PER HP	6250/6250 rpm 12.5	7000/7000 rpm 12.2	6500/6500 rpm 9.6	6800/6800 rpm 11.2	6250/6350 rpm 10.8
DRIVELINE					
TRANSMISSION	8-speed automatic all	8-speed automatic rear	8-speed automatic rear	8-speed automatic all	9-speed automatic all
DRIVEN WHEELS	1 4.71/5.9/37 2 3.14/8.8/55 3 2.11/13.1/82 4 1.67/16.5/103 5 1.29/21.4/128 6 1.00/27.6/128 7 0.84/32.8/128 8 0.67/40.6/128	1 5.00/5.2/36 2 3.20/8.1/57 3 2.14/12.2/85 4 1.72/15.1/106 5 1.31/19.9/139 6 1.00/26.0/155 7 0.82/31.7/155 8 0.64/40.7/155	1 4.60/5.6/36 2 2.72/9.5/62 3 1.86/13.9/90 4 1.46/17.8/116 5 1.23/21.1/137 6 1.00/26.3/171 7 0.82/31.6/165 8 0.69/37.6/160	1 4.71/5.3/36 2 3.14/7.9/54 3 2.11/11.8/80 4 1.67/14.9/101 5 1.29/19.3/128 6 1.00/24.9/128 7 0.86/29.7/128 8 0.67/36.7/128	1 5.35/4.9/31 2 3.24/8.0/51 3 2.25/11.5/73 4 1.64/15.8/100 5 1.21/21.5/131 6 1.00/26.0/131 7 0.86/30.2/131 8 0.72/36.0/131 9 0.60/43.3/131
GEAR RATIO:1/ MPH PER 1000 RPM/ MAX MPH					
AXLE RATIO:1	2.85	2.93	2.85	3.23	3.07
CHASSIS					
SUSPENSION	F: multilink, coil springs, anti-roll bar R: multilink, coil springs, anti-roll bar F: 14.0-inch vented disc R: 13.0-inch vented disc	F: multilink, coil springs, anti-roll bar R: multilink, coil springs, anti-roll bar F: 14.7-inch vented disc R: 13.6-inch vented disc	F: struts, coil springs, anti-roll bar R: multilink, coil springs, anti-roll bar F: 13.6-inch vented disc R: 12.4-inch vented disc	F: control arms, coil springs, anti-roll bar R: multilink, coil springs, anti-roll bar F: 13.8-inch vented disc R: 12.8-inch vented disc	F: multilink, air springs, anti-roll bar R: multilink, air springs, anti-roll bar F: 14.2-inch vented, cross-drilled disc R: 14.2-inch vented disc
STABILITY CONTROL	fully defeatable, traction off, competition mode	fully defeatable, traction off, launch control	fully defeatable, traction off, competition mode	fully defeatable, traction off, competition mode	fully defeatable, competition mode
TIRES	Pirelli P Zero 255/35R-20 97Y	Goodyear Eagle F1 Asymmetric 3 ROF F: 245/40R-19 98Y R: 275/35R-19 100Y	Pirelli P Zero Run Flat F: 245/40R-18 93Y R: 275/35R-18 95Y	Pirelli Cinturato P7 All Season 255/35R-20 97H M+S	Pirelli P Zero F: 245/35R-20 95Y R: 275/30R-20 97Y

CAR AND DRIVER TEST RESULTS

ACCELERATION					
0-30 MPH	1.8 sec	2.0 sec	1.7 sec	1.9 sec	1.6 sec
0-60 MPH	5.2 sec	4.7 sec	4.5 sec	5.0 sec	4.2 sec
0-100 MPH	12.3 sec	11.1 sec	10.3 sec	12.3 sec	10.7 sec
0-120 MPH	18.2 sec	16.3 sec	14.9 sec	18.5 sec	15.9 sec
1/4-MILE @ MPH	13.7 sec @ 105	13.2 sec @ 109	12.9 sec @ 112	13.5 sec @ 104	12.8 sec @ 109
ROLLING START					
5-60 MPH	5.6 sec	5.6 sec	5.2 sec	5.4 sec	5.3 sec
TOP GEAR, 30-50 MPH	2.4 sec	2.5 sec	2.6 sec	3.0 sec	2.8 sec
TOP GEAR, 50-70 MPH	3.1 sec	3.2 sec	3.3 sec	4.2 sec	3.5 sec
TOP SPEED	128 mph (gov ltd)	155 mph (gov ltd, mfr's claim)	171 mph (drag ltd)	128 mph (gov ltd)	131 mph (gov ltd)
CHASSIS					
BRAKING, 70-0 MPH	159 ft	168 ft	157 ft	181 ft	161 ft
ROADHOLDING, 300-FT-DIA SKIDPAD	0.93 g	0.87 g	0.93 g	0.86 g	0.92 g
WEIGHT					
CURB	4242 lb	4071 lb	4025 lb	4271 lb	4287 lb
%FRONT/%REAR	55.3/44.7	52.3/47.7	51.8/48.2	51.2/48.8	54.5/45.5
FUEL					
TANK	19.8 gal	18.0 gal	19.0 gal	19.5 gal	23.8 gal
RATING	91 octane	91 octane	91 octane	91 octane	91 octane
EPA COMBINED/ CITY/HWY	24/21/29 mpg	24/20/30 mpg	18/16/24 mpg	23/20/28 mpg	21/18/25 mpg
C/D 850-MILE TRIP	21 mpg	22 mpg	18 mpg	19 mpg	21 mpg
SOUND LEVEL					
IDLE	36 dBA	38 dBA	43 dBA	40 dBA	41 dBA
FULL THROTTLE	71 dBA	68 dBA	84 dBA	74 dBA	76 dBA
70-MPH CRUISE	64 dBA	64 dBA	66 dBA	64 dBA	63 dBA



The Jaguar XF's body contours flow as gracefully as the car itself along twisty roads. We wish its V-6 and interior fittings were as refined.

powerful of this quintet, with a 420-hp twin-turbocharged 3.6-liter V-6 under-hood, the Cadillac's handling is as sharp as its sheetmetal. To get the features and price up to parity with the others, we opted for the Premium trim level that starts at \$71,790. Add in the \$3000 Carbon Black package that brings Recaro seats and blacked-out wheels and trim, plus a few other options, and the total comes to \$75,885.

With five dressed-up sedans and no place to go, we decided to head toward the warmth of Palm Springs, California, to shake them down in the mountains that border the sleepy town. After several days and nearly 1000 miles, these five four-doors with so much in common on paper revealed their vastly different personalities.

5. JAGUAR XF S AWD

If this Jaguar triggers déjà vu, it's because the new XF looks a lot like the old XF. Undeniably familiar, the Jag is long and lithe, and it gets its luxury message across with gentle forms and striking proportions. It ties the Cadillac for top marks in exterior styling. The same story continues inside. There's a new 12.3-inch screen with

Jaguar XF S AWD

[+] Charming design, willing chassis.

[-] Uninspiring engine, down-market interior, not quite as refined as its peers.

[=] Old beyond its years.

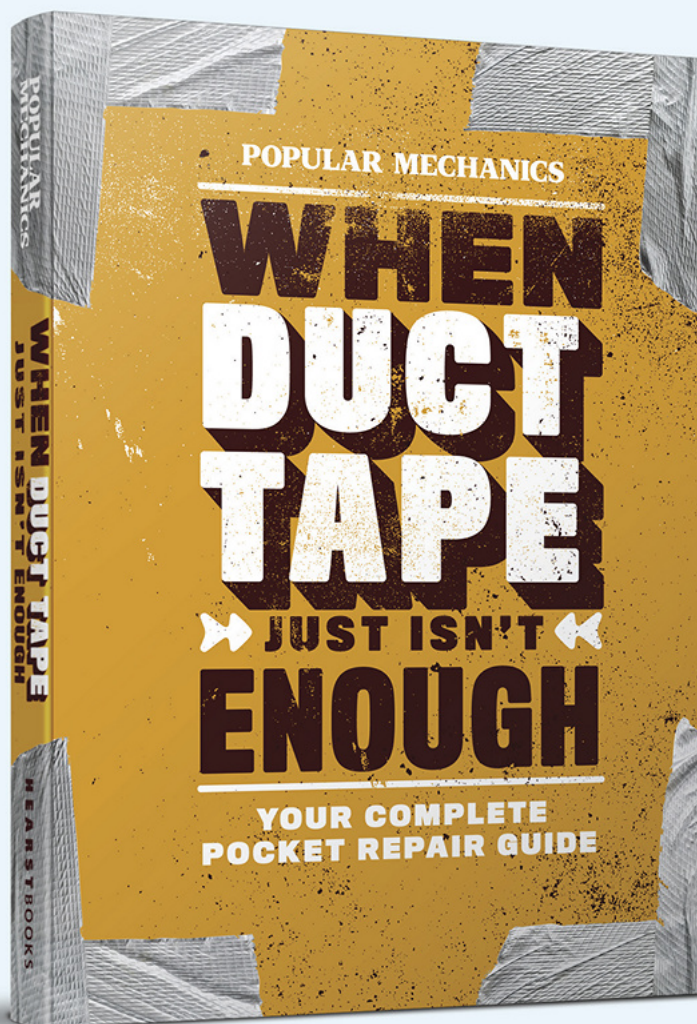
virtual gauges, and a 10.2-inch touchscreen that is both intuitive and faster-acting than its predecessor's and Cadillac's CUE. But the architectural basics of the previous XF's interior carry over, which makes the new car seem old beyond its years.

The XF's fountain of youth is just around the next corner, however. On the right road, the XF sloughs off its old skin and begins to bristle with vitality and personality. The steering wakes up under duress, and despite having all-season tires, the least skidpad grip, and the longest stops from 70 mph in the test, the XF had no trouble keeping up with the group. When pressed, the Jaguar exhibits handling poise and a flow that eludes even the BMW.

The hard saddles up front seem overly firm at first, but after a few minutes they yield and support. Even in two-tone Light Oyster and Jet Black, though, Jaguar's choice of hide isn't particularly soft or rich-looking. The same can be said of the rest of the interior. The materials aren't commensurate with the nearly \$80,000 price, and then there's the visible bit of foam between the windshield and the instrument panel that cannot be unseen once you see it. Speaking of seeing things, the fuzzy digits on the head-up display look as if they're being projected through a glass of bourbon.



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We never really warmed up to the supercharged V-6. It idles with a slight shake, and, although it only puts out a moderate 74 decibels at full chat, the Jag lacks the snarl of the other V-6s or the polish of the BMW inline-six. No complaints about power, although the XF's zero-to-60-mph time of 5.0 seconds only outpaced that of the Audi.

The Jaguar finished six points behind the BMW, but the two cars couldn't be more different. Combining the strengths of both would likely create a comparison-test-winning sports sedan.

4. BMW 540i

Above all else, BMW remains an engine company. It's right there in the name. If someone told us there was a V-12 under the hood of the 540i, we'd be inclined to believe it. In this group, the BMW inline-six distinguishes itself with an uncanny smoothness and refinement that escapes the V-6s. There's almost no perceptible difference in vibration between idle and 6000 rpm. We'd go so far as to call it electric-like, considering that its 68-decibel purr at maximum acceleration is the same number recorded in a Tesla Model S.

On paper, the engine may be the least powerful of the group, but the eight-speed-automatic 540i took third in the zero-to-60 run with a time of 4.7 seconds while return-

BMW 540i
[+] Is that a V-12 under there? Rolls-spec leathers and interior comfort.
[-] The steering and chassis are far too numb.
[=] A great luxury sedan from the brand whose reputation was built on sports sedans.

ing this test's best fuel economy at 22 mpg.

The BMW's interior design and execution are attempts to convince you that you bought the V-12. Impossibly soft, ivory-colored nappa leather covers the 20-way massaging seats that are part of the \$1600 Luxury Seating package. The longest wheelbase in the group—117.1 inches—pays back with a spacious rear seat that makes the 540i the limo in attendance. A comically thick M Sport steering wheel is the only clue inside that this BMW has any sporty pretensions.

BMW absolutely aced the luxury part of the assignment. Where the 540i gives up ground to the rest of the group is primarily in chassis tuning and steering feel. Even with two handling packages—the \$2600 M Sport package, which adds staggered Good-year Eagle F1 Asymmetric 3 summer tires on 19-inch wheels and lowers the car 0.4 inch on stiffer springs, and the \$3200 Dynamic Handling package that brings electromechanical anti-roll bars that keep the body flat in corners and automatically adjusts the electronic shocks—the BMW withholds the steering and chassis information we crave.

We expected a lot more sportiness from the new 5-series, certainly when equipped with two handling packages. Instead, it's simply a very nice luxury car.



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This generation of A6 is nearing the end of its life, but it remains a comfortable, attractive, reasonably priced luxury sedan that's plenty fun to drive.

More communication through the steering wheel would be a great start; the word "numb" was used repeatedly in every editor's notes. Fixing the steering to provide more feedback is necessary, but there's also a lack of handling poise that isn't very BMW-like. As the tires approach

their limits, the 540i lets go abruptly. The other vehicles are altogether more fluid when the breakaway begins, and without the steering feedback to warn you of impending slip, it's easy to push the BMW's chassis too far.

Part of the problem is that there isn't much grip here compared with the rest of the sports sedans in this group. Despite rolling on summer rubber, the BMW barely outstuck the Jaguar's less aggressive all-season tires. Executive editor Aaron Robinson summed it up best: "This car is a zombie; it moves without a pulse. Had more scary situations in it than others just because I was overdriving the tires and didn't realize it."

For those who want the Rolls-Royce of the group, look no further. For buyers who value having the word sports in front of the word sedan, there are better choices.



Audi A6 3.0T Quattro Competition
[+] No-fuss handling, great grip, brimming with quiet competence.
[-] Could do with a bit more fuss under the hood.
[-] An aging athlete that can still shame some younger talent.

3. AUDI A6 3.0T QUATTRO COMPETITION

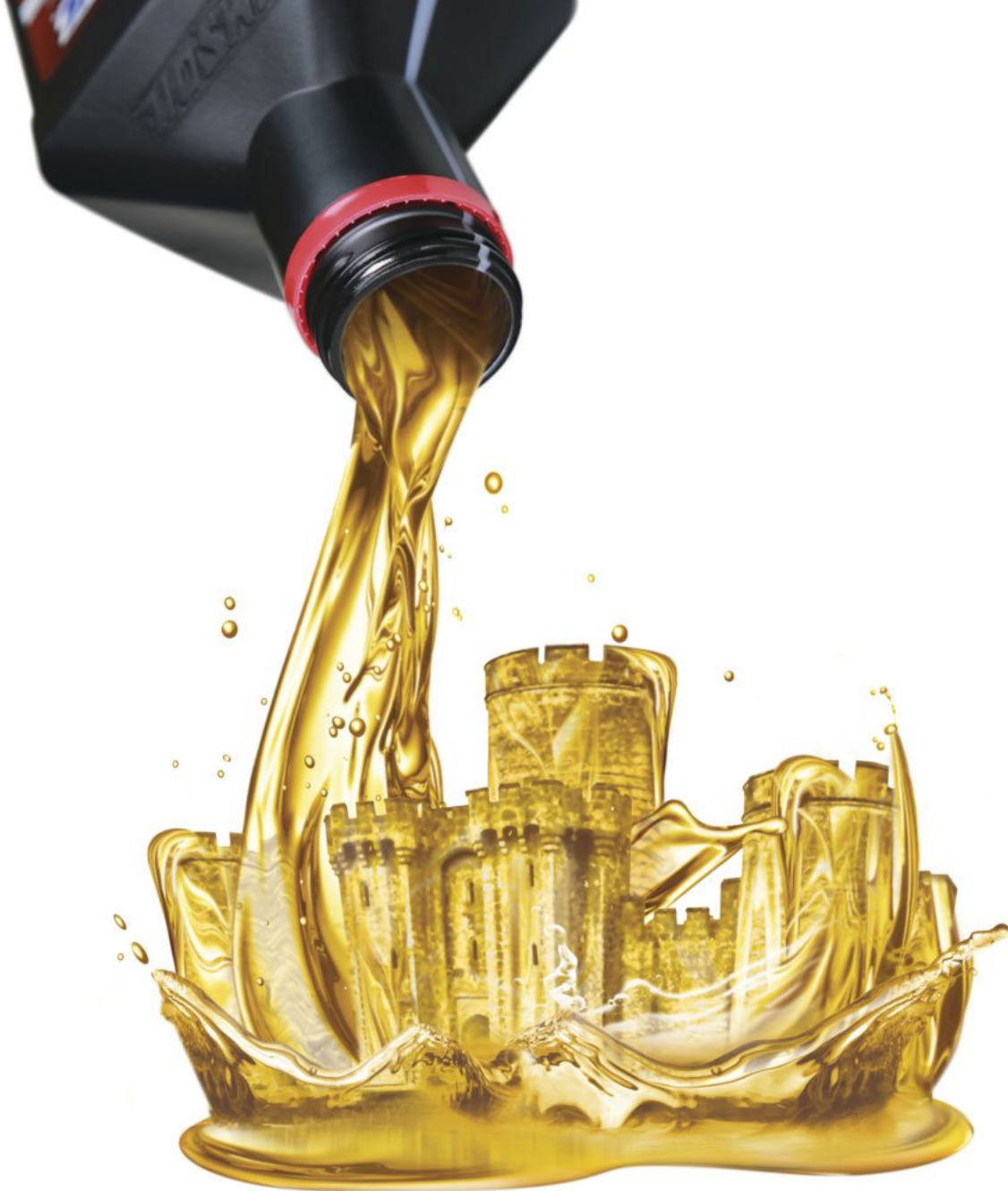
A comparo winner three years ago, the A6 is beginning to go grayer than our A6's Florett Silver paint. Since we last compared the A6, horsepower is up 30 to 340, but even with the added power, the A6 is the second-least-powerful car of the group and was the slowest to 60 mph at 5.2 seconds.

What we loved about the Audi hasn't changed: The whole car exhibits a fuss-free character that's endearing, from the secure handling that errs on the side of understeer to the unobtrusive engine that never calls attention to itself. The ergonomics and driver comfort are excellent, and the steering wheel is a joy to grip tightly. Moving a hand to Audi's MMI controller makes quick work of complicated tasks, such as phone pairing and entering a destination into the navigation system.

Now five years old, the A6's interior is no longer the benchmark in the class. Age spots, such as the tacked-on head-up-display projector, are noticeable, but the rest of the interior is maturing gracefully and it all works and feels right.

Light steering effort makes chasing down the others easy in the A6; simply point the nose and pin the throttle. At the skidpad, the Audi posted 0.93 g, matching the Cadillac for the best in the test. Fortunately,





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adding the Competition package doesn't negatively affect the ride, either. The A6 has just the right amount of compliance to straddle the narrow band between luxury and sportiness.

Brimming with quiet competence, the Audi didn't draw effusive praise, but we also didn't find much to complain about. That's a recipe for a midpack finish.

2. CADILLAC CTS V-SPORT

If the BMW could swap out its roundel for a flying lady, the Cadillac could definitely trade the wreathless crest for a Lotus badge. Not only is the 4025-pound CTS the lightest in the group, it also earned top marks in the chassis and fun-to-drive categories. Associate online editor Joseph Capparella called it "the only car here that fully comes alive in your hands."

Capparella is right. More so than the others, the Cadillac delivers a clear picture of what's happening at the tires through the steering and the cement buckets that are the Recaro seats. Next to the Audi, the BMW, and the Mercedes, with their digitized demeanors, you enjoy a deep vinyl groove in the Cadillac.

And as with vinyl, a few pops and buzzes come through. Little is filtered out of the CTS experience, and that shows up as tire, road, and engine noise. At full throttle, the

Cadillac CTS V-Sport

[+] Sports-car reflexes, quick and alive.

[-] Build-quality issues, the lameness that is CUE, could use more refinement.

[=] Right amount of sport, could use a touch more luxury.

Cadillac V-6 is by far the loudest at 84 decibels, and even though its 66 decibels at 70 mph is very quiet, it's the highest number here.

It's not just the Caddy's raw spirit that reminds us of a Lotus. The build-quality issues of our CTS test car would make Elise owners feel right at home. On day one, we noticed that the clip holding the C-pillar trim had pulled out, leaving the edge of the metal frame dangling. On day two, the top part of the driver's-side door molding began striking the rear door, and the check-engine light lit up due to an oil-pressure sender fault. Inside, there were a few creaks from the right-front door panel, though to be fair, the Jaguar and the Mercedes also had some door rattles.

Relative to the others, the Cadillac's rear seat is the smallest and the CUE infotainment system has the least attractive interface. Fuel economy for the CTS came in behind the others at 18 mpg, 4 mpg below the BMW. All that matters, of course, but the Cadillac's moves and acceleration, combined with the satisfaction that comes from driving it, transcend those flaws. It's by no means perfect, but at one point during our drive, every editor expressed a desire to own the Cadillac.

Powerful, frisky, and relatively lightweight, the Cadillac CTS V-Sport is the most fun-to-drive car in the class. Now about that luxury part . . .



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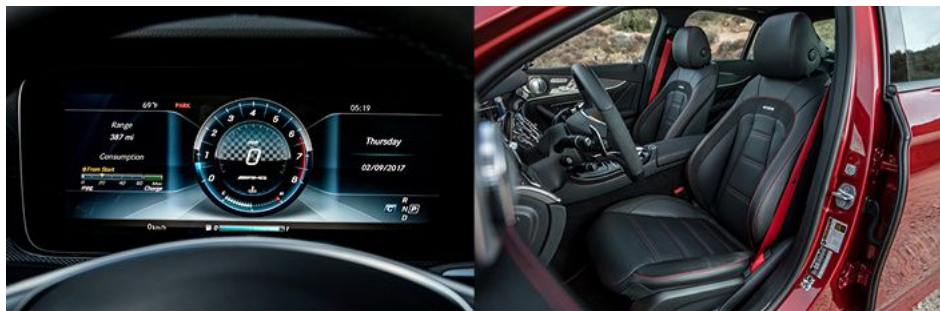


The E43 is a perfect balance of sportiness and luxury. You could drop \$8000 of our test car's option load and not feel as if you're missing a thing.

1. MERCEDES-AMG E43 4MATIC

Heavily optioned, the E43 bore the highest as-tested price (\$91,175) in the test, which is an amount of money that could buy you a 640-hp Cadillac CTS-V, as contributing editor John Pearley Huffman pointed out at every opportunity. In the scoring, the Mercedes lost points for its price, but it came out ahead in many other categories. Had it come to us without the \$7830 in frills that didn't add anything to the E43's inherent goodness, it would've really run away from the competition.

One option we probably would not pass up is the \$1100 Acoustic Comfort package that increases sound deadening throughout the floor and doors while adding an acoustic laminate to the windshield and side windows. We'd guess that this package is largely responsible for the 63-decibel near-silence at 70 mph. On the interstate, there's almost no road or wind noise. Kick up the speed to 100 mph and it's still a hushed 71 decibels. Along with the group's most solid structure, the Mercedes has on-road refinement that puts it in its own league, if not its own century.



Mercedes-AMG E43 4MATIC
 [+] Next-level refinement and comfort, a near match for the Cadillac's sportiness, just the right amount of attitude.
 [-] Next-level as-tested price, red seat-belts, occasional whacks from the tires.
 [=] The best balance of sportiness and luxury in the segment.

Silence is golden, but the Mercedes is a winner because its moves nearly match the Cadillac's. Answering your right foot in sport mode, the twin-turbo V-6 fills the cabin with as warm a 76 decibels as you'll hear in this class. Even next to the super-charged engines from Audi and Jaguar, the Mercedes 3.0-liter feels responsive and free of any turbo lag. Thanks in part to standard all-wheel drive, the Mercedes launches hard and posts a best-in-test 4.2-second run to 60.

AMG seems to equate heavy steering with sportiness, and the E43's takes a bit more muscle than the others, but it's also accurate and forthcoming with feedback. We'd like to see what an E43 would be like on the standard 19-inch wheels. On the optional 20-inchers, occasional impacts make it through; a taller sidewall might have damped them. Shod with the latest-generation Pirelli P Zeros, the Mercedes put up a solid 0.92 g on the skidpad, just behind the Audi and the Cadillac.

Even when not using the massaging function—part of the comprehensive \$7300



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12345						
VEHICLE						
DRIVER COMFORT	10	9	8	9	8	8
ERGONOMICS	10	8	7	9	8	7
REAR-SEAT COMFORT	5	4	3	4	5	4
REAR-SEAT SPACE*	5	5	4	5	4	5
TRUNK SPACE*	5	2	3	3	5	5
FEATURES/AMENITIES*	10	10	8	6	9	7
FIT AND FINISH	10	9	6	8	10	7
INTERIOR STYLING	10	8	7	8	8	7
EXTERIOR STYLING	10	8	9	7	8	9
REBATES/EXTRAS*	5	0	1	0	1	1
AS-TESTED PRICE*	20	15	19	20	17	19
SUBTOTAL	100	78	75	79	83	79
POWERTRAIN						
1/4-MILE	20	20	20	16	18	17
ACCELERATION*	5	2	3	4	3	4
FLEXIBILITY*	10	9	6	9	10	7
FUEL ECONOMY*	10	9	7	8	10	7
ENGINE NVH	10	9	8	8	9	8
TRANSMISSION	10	9	8	8	9	8
SUBTOTAL	55	49	44	45	50	43
CHASSIS						
PERFORMANCE*	20	19	20	20	18	16
STEERING FEEL	10	9	9	7	6	7
BRAKE FEEL	10	9	9	8	8	8
HANDLING	10	9	10	8	6	8
RIDE	10	9	8	9	7	8
SUBTOTAL	60	55	56	52	45	47
EXPERIENCE						
FUN TO DRIVE	25	22	24	20	17	20
TOTAL	240	204	199	196	195	189

*These objective scores are calculated from the vehicle's dimensions, capacities, rebates and extras, and/or test results.

Premium 3 package—the E43's seats were deemed the most comfortable and the best at holding you in place during aggressive cornering. As with the BMW, Cadillac, and Jaguar, the Mercedes features digital gauges. And although we'd like its screens to be better integrated into the instrument panel, it has the clearest and best graphics of the bunch. Robinson, who is not known for being merciful, wrote, "If Mercedes has been guilty of cheaping out in the past, all is forgiven with this car."

A clear winner despite its lofty as-tested price, the E43 nails both the sport and luxury sides of the equation. It's almost binary in this respect: completely docile when hustled down a freeway, and eager, aggressive, and steadfast in corners. The E43 is a truly modern machine, a thoroughly 21st-century sedan in a group that still has a few toes stuck in the past. 🇩🇪

War can be fought



sometimes even sandwiches.

It's a mission of four-wheel-drive diplomacy as we retrace the Cold War routes of U.S. intelligence in a Mercedes G-wagen and an SRT Jeep. *_by Mike Duff_* *_photography by Tom Salt_*

with many things,



Larry Kelley, retired Marine Corps colonel and ex-reconnaissance man, on the Glienicke Bridge, a.k.a. the Bridge of Spies.



Soviet soldiers were always hungry,” says Larry Kelley, a retired Marine Corps colonel who during the Cold War swapped the excitement of piloting Douglas A-4 Skyhawks for the even greater thrills of gathering military intelligence behind the Iron Curtain. Apparently, rather than issue maps, the Red Army used “route directors,” or troops who would be dropped at junctions to act as human signposts, showing a convoy which way to go. “They’d be left for hours, sometimes even forgotten,” Kelley explains. “We’d give them cigarettes or sandwiches. If there was nobody around, they’d often talk to us, tell us where they were from, even when a column was coming back.”

Yet despite operating inside enemy territory, and often having to evade capture, Kelley served while wearing a uniform and insists he wasn’t a spy. “We were doing overt reconnaissance. We just happened to be doing it under the Soviets’ noses.”

Kelley served two tours with the United States Military Liaison Mission (USMLM), one of the more exciting postings of the Cold War—and not just because it involved occasional car chases with the Stasi, East Germany’s feared secret police. At the same time that hundreds of thousands of NATO and Eastern Bloc troops faced each other across the Iron Curtain, when even the smallest confrontation could have turned the world into a radioactive frittata, each side allowed the other to mount what were effectively intelligence-gathering patrols in each other’s sectors of Germany.

While the Military Liaison Missions had started out as just that—a chance for the victorious powers that occupied Germany at the end of World War II to stay friendly—they acquired a new purpose as the Cold War turned frosty and Germany was divided



between the free West and the Communist East with a heavily armed border between them. The USMLM worked almost in parallel with British and French missions to gather intelligence in the Soviet sector through reconnaissance “tours,” while the Soviets mounted their own patrols in the West.

It wasn’t always done with fast cars. Early tours used the sort of sedans that would normally have ferried around staff officers, but these proved ill suited to the often physical demands of going toe to toe with Ivan, who was occasionally forceful in his reluctance to share military secrets with capitalist lackeys. East Germans were pissed at foreigners being allowed free rein of their tightly controlled state, a place where one in 40 of the adult population was an active informer for the Stasi. Tours were routinely obstructed—blocked, detained on flimsy pretexts, sometimes even rammed by military vehicles, and occasionally shot at.

These days the Glienicke Bridge is just a bridge, a latticework of metal connecting Berlin with its southwest suburb of Potsdam over the Havel River. But for four decades, it was the back door into the Eastern Bloc, a crossing that only diplomats and military missions were allowed to use between West Berlin, which was itself an

island of freedom in a Communist sea, and the so-called German Democratic Republic (GDR). Its secondary use, as immortalized in *Bridge of Spies* and likely responsible for the large number of tour buses passing by, was the occasional exchange of captured spooks and military personnel.

It's where our story begins, as did every USMLM tour. "There was a 'mission house' in Potsdam [in the GDR], but once we'd left that we were effectively on our own," Kelley explains. At 70, he's now a sprightly but soft-spoken retiree with a huge enthusiasm for his former life. He can still rattle off all the differences between various T-80 tanks, and today lives in Bavaria with his German wife.

Back then, the tours that Kelley took didn't carry weapons or radios, but the cars had to wear distinctive yellow license plates that East Germans were expected to report on sight. USMLM used two-man crews, with noncommissioned officers acting as drivers and the tour officers responsible for giving orders, identifying enemy equipment, and harvesting "human intelligence" through proficiency in both German and Russian. (Kelley's Russian is good enough for him to have been a top-level interpreter.) Once past the border, they would roam the country visiting known military sites and convoy routes, trying to identify which units were deployed where. Although the Soviets denied the tours permission to operate in some "permanently restricted" areas, there were still plenty of targets in a small nation that was basically an enormous garrison.

Evading unwanted attention came to determine the missions' choice of vehicles, with an increasing emphasis on off-road ability. Our British counterparts went to the considerable effort of engineering all-wheel-drive versions of big Opel sedans, before switching to Range Rovers. The BRIXMIS (British Commanders'-in-Chief Mission to the Soviet Forces in Germany), as it was called, even tried an early Audi Quattro, although it reportedly managed to break the car in under an hour. The USMLM used both Ford Broncos and Jeep Wagoneers at various points in the 1970s, but all three allied missions largely switched to the Mercedes G-wagen soon after it was introduced in 1979. After all, who wouldn't want to roll in a Benz behind enemy lines?

We'd hoped to use a modern G-class to play on the connection with the old car. But, uncharacteristically, Daimler refused our request for one, saying it feared a U.S.-Russian storyline was too contentious given the recent rise in global tensions. Proof, if it were needed, of *Car and Driver's* international political influence.

Fortunately we managed to track down an original USMLM G-wagen anyway [see sidebar], and Jeep had no such peacenik reluctance when we asked for a Grand Cherokee SRT to celebrate the military service of those far-off Wagoneers. This one was rushed to Berlin straight from its European press launch, the combination of Ferrari-red paintwork and Italian license plates winning



Top: Sign warning of a restricted area Liaison tours were supposed to avoid—and sometimes did. Above: Soviet newspaper was decidedly pro-Lenin.

it nearly as much attention as we would have achieved in an AMG G63, at less than a third of the price—and with nobody stopping us to try and buy cocaine.

We cross the Glienicke Bridge to pass through Potsdam and head farther into the former GDR. There's snow on the ground, giving us an appropriately bleak photographic backdrop, but icy roads see the SRT struggling to find traction for more than a scant percentage of its horsepower. "Rule one was always not to crash or get stuck," advises Kelley from the passenger seat as the Jeep slews momentarily sideways. The old Mercedes is more of a mountain goat—slower but sure-footed over everything we encounter. While Berlin is leaving its divided past behind to the extent that it's now hard to spot where the heavily fortified border once stood, things have changed less out in the countryside since Germany got stuck back together. "I remember how gray everything looked—the people and the places," Kelley says. It's still pretty gray now, especially as dusk arrives and the number of unlit houses shows how many people have moved away.

Areas like these were prime hunting ground for the Stasi, who would try to follow and obstruct passing patrols—their ire piqued by the fact that none of the three allied missions, which had been founded before the GDR, officially acknowledged the existence of the East German state. The Stasi men "were always easy to spot," Kelley remembers, "three young guys trying to look inconspicuous in a shiny car, in a country where you had to wait years to buy one. Often they'd all be wearing black leather jackets, just like in a second-rate movie."

Evasion sometimes meant just running—the 280GE's 98-mph top speed was higher than that of any Lada or Wartburg that might be chasing it (though rather tame compared with the SRT's 160-mph limiter). The Soviets had nothing fast, although the Stasi had some cars that had been confiscated from West Germans, Kelley says, remembering a blue BMW. But rather than sprint, crews



The O.G.-wagen

When the United States Military Liaison Mission wound down after the reunification of Germany, its various assets, both human and mechanical, were reabsorbed by the U.S. military. That included the last batch of Geländewagens in service at the time, some of which were sent to northern Iraq after the first Gulf War. The one pictured here made that long journey, then found its way back to Berlin, eventually ending up on a suburban street under a tarpaulin where it was spotted by a former USMLM mechanic.

It now belongs to Marcus Lemke, an auto upholsterer, and after a ground-up restoration is in pretty much the exact condition it was in when it rolled through the Soviet zone. As such, it's a damned civilized way to go to war, with the G-wagen's most powerful (for its time) six-cylinder gas engine, an automatic transmission, and even heated seats. Modifications included an opening roof for static observation, extra driving lights, a winch, and long-range 45-gallon fuel tanks. It was restored by Martin Kruger, a G-wagen obsessive who owns several USMLM-spec cars from the period. He remembers as a teenager in Berlin seeing a mission-spec car rushing over the Glienicke Bridge at night and racing toward the city with its lights off.

Driving this 280GE confirms that there's a nice-sounding burble from under the hood and respectable full-throttle acceleration. Slow-gear steering requires lots of input—full respect to anyone who hustled one of these in a pursuit scenario—but this G rides noticeably better than its blinged-up modern descendants do. It's definitely cooler, too. In fact, we wouldn't mind if this were the only factory color offered. Pink just seems to rob the G-wagen of too much of its dignity. —MD

were trained to use terrain to their advantage and head off-road.

"Most of the time we'd look to leave a hard surface, go along a trail or through a forest. They couldn't keep up with us; I don't think their drivers were very good—although they were often willing to take risks—and their vehicles certainly couldn't handle mud or snow. We'd lose them and then double back or take another route."

The G-wagens had extra underbody reinforcement and electric winches in case they got stuck, but didn't carry any extra protection beyond that provided by a sizable roll bar. Things often got physical, especially when the more belligerent Soviet forces were involved. "I was rammed on my very first tour—the only time it happened to me," Kelley says.

"It was a training tour, so we had another officer in the back seat. We were in an area with no Soviet facilities—we were just driving. By chance we were behind a Soviet KAMAZ dump truck in traffic, the road was narrow, and there was nowhere to maneuver. All of a sudden the driver puts it in reverse, backs up, and slams into our hood. I nearly had the license plate engraved in my teeth. Then he speeds off. We protested it, and even though we gave the number to the Soviets, the response was 'we don't have that license plate, it can't be ours.'"

We part company with the G-wagen after lunch and head into the wilds of Brandenburg—flat, gray agricultural land that Kelley says has changed little in the three decades since the Iron Curtain

fell off its rails. The Grand Cherokee is an accomplished cruiser, which is not an accusation you could level at any G-wagen, and even shows some respectable off-road chops as we detour through a field in search of a suitably moody photo location.

Like most tour officers, Kelley adopted a softly-softly approach whenever possible, using the high-tech surveillance gear he was issued to keep the maximum distance from targets. Tour vehicles got the latest camera and video equipment, with special infrared driving lamps and spotlights to allow them to be driven at night. "The best coverage of a target was always to get what you needed without being seen; could you pick their pockets without them even knowing it?" Kelley says. "You had to be on your guard every second; a normal situation could turn completely, and a minute later you could be in a high-speed chase you hadn't anticipated."

Sometimes a more aggressive approach was required. Kelley once chased down a convoy carrying parts of an unfamiliar missile system that was traveling at night, passing it three times to take photographs. It confirmed that the Soviets had deployed the so-called Scaleboard nuclear launcher to East Germany for the first time. "That one rang bells all the way up the chain of command," he remembers. Sometimes tours would even infiltrate Soviet facilities, finding intelligence in thrown-away documentation. One of the USMLM's biggest coups came in 1984, when the then-new T-64B tank was found unguarded on a test range the day after a

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holiday, when the whole Red Army was sleeping off a Siberia-sized hangover. The tour photographed it inside and out, confirming the presence of a laser range-finder and an anti-tank missile system.

We're up early the following day to head to Ludwigslust, a small, dull town two hours northwest of Berlin. On the basis of our limited time there, the most interesting fact about the place might be that it's twinned with Muscatine, Iowa. But it's also where the considerable risks being run by the USMLM became tragically real.

Getting there gives the Jeep a chance to stretch its legs on the A24 autobahn. On the de-restricted sections, the SRT accelerates effortlessly to two miles a minute with plenty to spare; only patchy fog—and the poor lane discipline of Eastern European trucks—prevented a full-on attempt to find the speed limiter. Such entertainment comes with a sizable price tag, with Germany's 1.50-euros-a-liter super unleaded working out to just over \$6 a gallon. Back in the '80s, the very idea of a Jeep capable of 125 mph would have seemed as ridiculous as a German rock star without a mullet.

Our destination is in the forest south of Ludwigslust, where a modest memorial stone sits next to the B191 highway. This used to be a Soviet training area and a frequent target of tours searching for the tanks that used its firing ranges. In March 1985, a tour led by U.S. Army Major Arthur Nicholson came here to hunt for armor. The range seemed to be empty, and Nicholson left his G-wagen to have a closer look at the “tank sheds” where vehicles were sometimes concealed. At that point, a Soviet sentry, undetected in the woods, fired three shots.

Nicholson was hit in the chest and collapsed. His driver, Staff Sergeant Jessie Schatz, tried to help with a first-aid kit but was forced to return to the car by the sentry at gunpoint. Nicholson died; even immediate medical aid was unlikely to have saved him, and his body was left lying on the ground for several hours while



Top: Kelley holds up a mission badge worn by USMLM members. Above: Nicholson's memorial stone sits near the town of Ludwigslust.

the Soviets summoned senior USMLM officers, including Kelley, and tried to put the blame on them. When his body was finally allowed to return to Berlin the following day, it went past an honor guard on the Glienicke Bridge. Kelley was riding in the back of the ambulance alongside his colleague. He saw two senior Soviet officers salute as the convoy passed: “If they were seen doing that, they could have got into a lot of trouble, but they were decent human beings doing the decent thing.” Nicholson's body was flown back to the States and is buried in Arlington National Cemetery.

Nicholson's death highlighted the risks of baiting the Russian bear. The sentries at Ludwigslust had previously opened fire on an East German jogger, and shooting incidents weren't uncommon, despite standing orders for Soviet sentries to issue warnings first. In 1984, a French mission driver had been killed when his car was deliberately rammed by a Soviet truck, and in 1987 another U.S. tour was fired upon, their vehicle hit seven times and the driver wounded in the arm. But Nicholson would be the only USMLM member to be killed at the hands of the Soviets.

After visiting Ludwigslust, we hook around Berlin to make one final stop at the vast Wünsdorf-Waldstadt army base, the Red Army's German HQ that controlled the military machine the missions were targeting. At its peak, the complex was home to 75,000 soldiers and their families and had daily trains running to Moscow. Now most of it stands derelict, with some of the nicer buildings fenced off and guarded by a caretaker called Jürgen who lets us in to take a look (for 15 euros each). The Russians finally took off in 1994—five years after the Berlin Wall came down—leaving about 29 tons of munitions and nearly 100,000 rounds of ammunition requiring removal to make the site safe. Now there's little here but ghosts, a few Communist murals, and a crumbling statue of Lenin.

How important were the missions? Kelley—who later went to the former Soviet

Union to monitor the disposal of nuclear weapons—has no doubts: “Our information was the gold standard. It was what was actually happening on the ground, and pretty much the whole military had access to it. We knew which units were where, what they were equipped with, even what their morale was like. We got to see the Soviets up close, we knew their secrets—how they sold gasoline on the black market and drank aircraft de-icing alcohol—but we also knew what was normal and what wasn't.”

The nostalgia felt by some for the binary certainties of the Cold War is almost certainly misplaced; the world really could have ended like the last scenes of *Dr. Strangelove*. But the Liaison missions were a vital part of the process that kept everything under careful observation. If things had heated up, these were the guys who would have known about it first. ■

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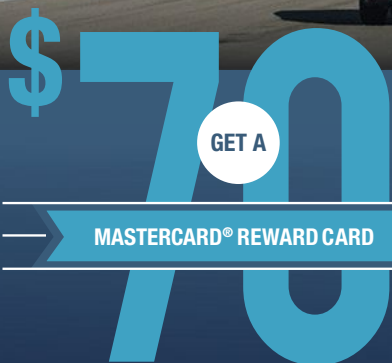


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SUSPENSION



PENNY

2017 Hyundai Ioniq Hybrid ▾



WISER

Korea's attempt to out-Prius the Prius.

by Aaron Robinson

photography by Greg Pajo



Hyundai doesn't just want to be Toyota, it wants to break Toyota, in part by relentlessly copying the Big T's jiu-jitsu. Toyota created the mass-market hybrid, and it's pretty much had the corner on it, as others chipped futilely at Fortress Prius with unworthy competitors, including the failed Honda Insight, or shied away from hybrids altogether.

Yet, even as soft fuel prices have partially deflated the eco-car business over the past year, Hyundai sees opportunity, both in newfangled ride-sharing fleets where the break-even point on a hybrid is easily reached, and in up-and-coming millennials. They will represent 40 percent of new-car buyers by 2020. And as long as these young'uns stay the course with their values as they age (just like the baby boomers, cough), including a preference for urban living and smaller electrified vehicles, a parade of bearded and plaid-wearing buyers could march right into Hyundai's open arms.

The Ioniq and its sister, the Kia Niro crossover, are just volleys one and two in a seven-vehicle broadside over the next year intended to bust the Prius's lock on the average person's mental image of a hybrid. Hyundai's plan is to fight hard on pricing. The base \$23,035 Ioniq Blue comes in \$2535 under the base Prius Two, though you'll have to compare the respective features lists closely to see which car has the stuff that matters to you. Would you rather have heated mirrors (Prius) or dual-zone climate control (Ioniq)? As you go up the Ioniq's trim levels, from Blue to SEL to Limited, the Hyundai's price advantage narrows but remains.

Hyundai plans to employ the same basic component set to yield not only the hybrid Ioniq, which in its most stripped-down Blue trim lays claim to a 58-mpg EPA average, but a plug-in hybrid and a full EV as well. It is also Hyundai's first platform designed with autonomy in mind, the car said to be ready to add all-seeing, all-knowing hardware to its portfolio of optional driver's aids when the tech becomes available.

There is opportunity here. If Toyota can be faulted for something besides refusing to make anything more than modest improvements to the Prius's handling, it's for not expanding the Prius subbrand into body styles such as crossovers, which are the preferred choice of today's buyers. Not everyone willing to pay extra for electrification wants a potato, and Hyundai doesn't plan on making that same mistake.

However, first we get a Hyundai potato that looks a lot like a Toyota potato, and indeed like the Idaho russet that was the Honda Insight. And that's not really anyone's fault. If Mother Nature had simply taken a few classes at Art Center, we'd all be driving around in Ferrari 330 P4s. But her

wind tunnel rewards a somewhat zaftig form with small wheels and a tall, billboard butt. Toyota wrestled with this conundrum on the current Prius by assigning the front and rear styling to Wavy Gravy. But Hyundai has decided to be practical and adorn the Ioniq with a more conventional suite of corporate brand motifs that meld into a pleasing expression of cultured grace.

If the Ioniq looks like an Elantra with a hatchback, that's because it more or less is. The Ioniq's 106.3-inch wheelbase is identical to the Elantra's, and its strut front and multilink rear suspensions, while having more aluminum, owe much to Hyundai's popular compact. Any driver of the current Elantra won't even need to spend much time with the Ioniq's owner's manual, as the control placement, the classy "piano key" buttons, the technically grained plastics that effectively disguise the cheap bits, and the functions of the central touchscreen are so familiar. Both cars have great, Uber-iffic rear-seat room. Perhaps the best reason to choose the Ioniq over an Elantra is the healthy cargo capacity. Spreading the rear dampers far apart helped create a cavernous barn in back, especially once the rear seats are folded. And the hatch hole is wide and accommodating for large items.

The Ioniq's other main engineering accomplishments include a relentless thrifting of the internal-combustion engine [see sidebar] and incorporating a 12-volt lithium-ion battery into the same pack as the hybrid's 240-volt, 1.6-kWh lithium-ion battery. Until now, non-plug-in hybrids have typically followed a more conventional route with cheaper, less power-dense (but less tempestuous) nickel-metal-hydride batteries and separate lead-acid 12-volt batteries. In the Ioniq, both the 12- and 240-volt batteries get crammed into a single box compact enough to fit under the rear bench with only a small ventilation

The Ioniq is the quicker, better-looking Prius for buyers who don't want to be seen driving around in a car out of some designer's anime fantasy world.



+ Quicker, cheaper, and better-looking than a Prius, and equally efficient.

– Hardly thrilling, needs a little more driveline refinement.

= A perfectly pleasant alternative to the Prius, if that's what you're seeking.



grille to give it away. Hyundai also offers the industry's first life-time battery warranty, removing one fear that causes potential buyers to reject electrified cars.

Like the Prius, the Ioniq is built for and thrives in the kind of stop-go-stop commuting that helps keep Xanax in short supply. Hyundai sets no benchmarks with the steering feel, which is fairly lifeless, but it does spec expensive Michelin Primacy MXM4 tires with a 65,000-mile warranty on the optional 17-inch wheels (the base 15-inch wheels are shod with Michelin Energy Saver tires). And the Ioniq's suspension, while a little on the firm side—especially with the tires inflated to the recommended 36 psi, a somewhat high number for a 3173-pound car—does a fine job keeping the rubber facedown, the body fairly upright in corners, and the driver feeling in control. It produced 0.86 g on the skidpad against 0.82 turned in by a 2016 test of the mid-level Prius Three.

The Ioniq runs in a somewhat lethargic eco mode unless you slide the shifter left, which drops it into sport mode and perks up the throttle considerably and can also activate a manual-shift mode if you push or pull the shifter and take control of the six-speed dual-clutch automatic. Sport mode also conjures up a tachometer in the digitized instrument cluster to reveal that, even at full tilt, the Ioniq's gearbox routinely shifts before 5700 rpm, where the 1.6-liter inline-four makes its claimed peak

104 horsepower. Hyundai chose this transmission for its efficiency over a conventional automatic with a torque converter and planetary gearsets—and because it has no two-motor CVT akin to a Prius's (and because only Honda has ever been allowed by the World Police to build a manual-transmission hybrid). Fully nailed, our Ioniq returned an 8.9-second trot to 60 mph, another drubbing of the 10.5-second Prius, which weighed only 3113 pounds.

Always driving in sport mode defeats the Ioniq's purpose as a mileage stretcher, though eco mode produces only the faintest responses from the gas pedal. This is particularly apparent on the





For this evaluation, we drove like a normal person might. Were it our car, we would leave it in sport mode.



freeway if you're trying to scurry around someone, especially on a grade. You really have to put the spurs to the Ioniq to tap its modest giddyup, and the rote engine thrum lets you know that this is not a machine built for thrills.

The powertrain switches from electric to gas to combined thrust mostly transparently, though the occasional driveline jerk slips through as the electric motor/generator and six-speed seem to fall out of sync. The car also takes its time shifting between drive and reverse, and unless you hold the brake, it may even roll downhill a bit while its computers do the math and move the levers. The regenerative braking is fairly mild and there's no max-regen mode as in the plug-in Ioniq or Prius or Chevy Volt, probably because the Ioniq hybrid's battery capacity is too small to really benefit from it. Thus, you can't "one-pedal" the Ioniq.

2017 HYUNDAI IONIQ HYBRID LIMITED

PRICE AS TESTED **\$31,460**
BASE **\$28,335**

VEHICLE TYPE: front-engine, front-motor, front-wheel-drive, 5-passenger, 4-door hatchback
OPTIONS: Ultimate package, \$3000; carpeted floor mats, \$125
AUDIO SYSTEM: satellite radio; minijack, USB, and Bluetooth-audio inputs; Android Auto and Apple CarPlay interfaces; 8 speakers

ENGINE

Atkinson-cycle inline-4, aluminum block and head
BORE X STROKE 2.83 x 3.82 in, 72.0 x 97.0 mm
DISPLACEMENT 96 cu in, 1580 cc
COMPRESSION RATIO 13.0:1
FUEL DELIVERY SYSTEM: direct injection
VALVE GEAR: double overhead cams, 4 valves per cylinder, variable intake- and exhaust-valve timing
REDLINE/FUEL CUTOFF 5500/5500 rpm
POWER 104 hp @ 5700 rpm
TORQUE 109 lb-ft @ 4000 rpm

MOTOR

synchronous permanent-magnet AC
POWER 43 hp
TORQUE 125 lb-ft
NET SYSTEM POWER 139 hp
NET SYSTEM TORQUE 195 lb-ft

BATTERY PACK

air-cooled lithium-ion
CELL COUNT/CONSTRUCTION 64/prismatic
CAPACITY 1.6 kWh
MANUFACTURER LG Chem

DRIVETRAIN

TRANSMISSION: 6-speed dual-clutch automatic with manual shifting mode
FINAL-DRIVE RATIO 4.19/3.05:1*

GEAR	RATIO	MPH PER 1000 RPM	MAX SPEED IN GEAR (rpm)
1	3.87	4.4	22 mph (5000)
2	2.22	7.8	43 mph (5500)
3	1.37	12.5	69 mph (5500)
4	0.93	18.5	102 mph (5500)
5	0.96	24.7	116 mph (4700)
6	0.77	30.8	110 mph (3550)

CHASSIS

unit construction with a rubber-isolated front subframe
BODY MATERIAL: steel and aluminum stampings

STEERING

rack-and-pinion with variable electric power assist
RATIO 13.9:1
URNS LOCK-TO-LOCK 2.6
TURNING CIRCLE CURB-TO-CURB 34.8 ft

SUSPENSION

F: ind. strut located by a control arm, coil springs, anti-roll bar
R: ind; 1 trailing arm, 2 lateral links, and a toe-control link per side; coil springs; anti-roll bar

BRAKES

F: 11.0 x 0.9-in vented disc, 1-piston sliding caliper
R: 10.3 x 0.4-in disc, 1-piston sliding caliper
STABILITY CONTROL fully defeatable, traction off

WHEELS AND TIRES

WHEEL SIZE 7.0 x 17 in
WHEEL CONSTRUCTION cast aluminum
TIRES: Michelin Primacy MXM4 225/45R-17 91V M+S

EXTERIOR DIMENSIONS

WHEELBASE 106.3 in
LENGTH 176.0 in
WIDTH 71.7 in
HEIGHT 56.9 in
FRONT TRACK 61.0 in
REAR TRACK 61.5 in
GROUND CLEARANCE 5.3 in

INTERIOR DIMENSIONS

SAE VOLUME F: 52 cu ft R: 42 cu ft
CARGO VOLUME 27 cu ft

You get limited data about mileage performance, including a percentage breakdown that classifies your driving as either “economical,” “normal,” or “aggressive.” When we calculated our 45-mpg test average, that display showed 49 percent, 42 percent, and 9 percent, respectively, a seemingly normal spread, lest you believe our usual lead feet are what caused the test average to fall well short of the 55-mpg EPA combined rating for our Limited-trim test car. We might have done better if the Ioniq rewarded its handlers for stingier driving through the display, as the Ford C-Max does with its ever-growing leafy vines. That kind of digital pellet-drop can get the mice working harder to excel in the experiment, but the Ioniq offers no such rewards.

Actually, real-world fuel economy in the mid-40s is par for this class. The Prius delivered 42 mpg and 44 mpg on its 54-city/50-highway rating in two separate tests. Hybrids in general shine especially brightly in the EPA’s tests, and the Ioniq appears to be no exception. Whether Hyundai’s hoped-for social changes mean it’ll shine in the showroom is another question, but ride-share drivers wanting only the lowest-priced and most efficient potato will surely come calling, and that’s a start. ■

CAR AND DRIVER TEST RESULTS

ACCELERATION

ZERO TO	SECONDS
30 MPH	3.0
40 MPH	4.5
50 MPH	6.5
60 MPH	8.9
70 MPH	11.8
80 MPH	15.9
90 MPH	20.6
100 MPH	26.6
110 MPH	37.0
ROLLING START, 5–60 MPH	9.0
TOP GEAR, 30–50 MPH	4.7
TOP GEAR, 50–70 MPH	6.4
1/4-MILE	16.9 sec @ 82 mph
TOP SPEED	116 mph (gov ltd)

HANDLING

ROADHOLDING, 300-FT-DIA SKIDPAD	0.86 g
UNDERSTEER	Moderate

BRAKING, 70-TO-ZERO MPH

SHORTEST STOP	177 ft
LONGEST STOP	183 ft
FADE RATING	None

WEIGHT

CURB	3173 lb
PER HORSEPOWER	22.8 lb
DISTRIBUTION	F: 59.9% R: 40.1%
TOWING CAPACITY	0 lb

FUEL

CAPACITY	11.9 gal
OCTANE	87
EPA COMBINED/CITY/HWY	55/55/54 mpg
C/D OBSERVED	45 mpg

INTERIOR SOUND LEVEL

IDLE	27 dBA
FULL THROTTLE	73 dBA
70-MPH CRUISING	68 dBA

*The first ratio is for gears 1–4, the second is for gears 5 and 6.

Shell V-Power
NITRO+
Premium Gasoline
The Official Fuel of
CAR AND DRIVER

Explained: The Finer Points of Gas-Engine Efficiency

Hybrid efficiency is far more complex than pairing an electric motor/generator with a gas engine. The Ioniq’s Atkinson-cycle 1.6-liter inline-four optimizes the miles from every gallon of gas thanks to efficiency-boosting measures such as its water-cooled exhaust-gas-recirculation system. With lower EGR temperatures, the Ioniq’s Kappa engine can fill each cylinder with as much as 20 percent exhaust gas during the intake stroke. The typical uncooled EGR system displaces only 10 percent of the fresh-air charge. Hyundai claims that this difference alone is good for a 3 percent fuel-economy benefit by reducing the engine’s pumping losses.

The engine cooling system uses a split-circuit design to modulate the temperatures of the head and block separately. The control logic opens the cylinder head thermostat at 190 degrees, while coolant

starts flowing to the block at 221 degrees. The higher block temperature decreases the viscosity of the oil, reducing friction. Lower cylinder-head temperatures help prevent knock, allowing Hyundai to use a high 13.0:1 compression ratio and more-advanced ignition timing. The engine’s Atkinson-cycle operation further reduces pumping losses with an expansion stroke effectively longer than its compression stroke. The net result is a claimed 40 percent thermal efficiency for the internal-combustion side of Hyundai’s gasoline-electric powertrain. —Eric Tingwall

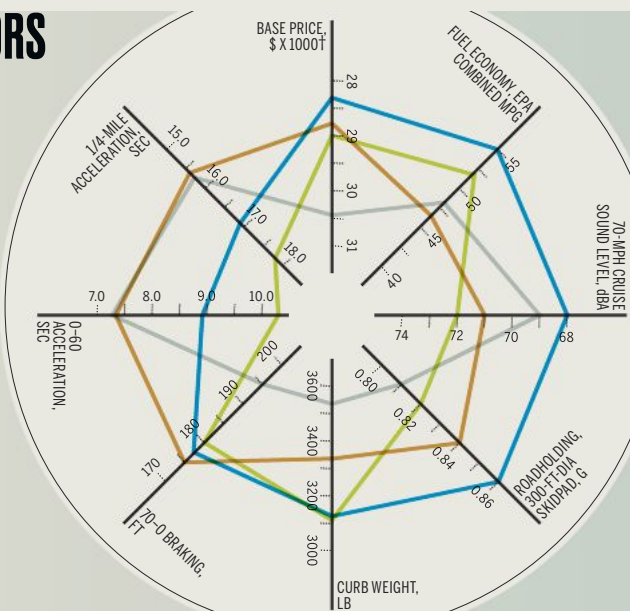


COMPETITORS

Cast from the mold that the Toyota Prius carved, the Ioniq owns its mark.

- **HYUNDAI IONIQ**
1.6-L I-4 + MOTOR, 6-SP AUTO
- **CHEVROLET MALIBU HYBRID**
1.8-L I-4 + MOTOR, CVT
- **HONDA ACCORD HYBRID**
2.0-L I-4 + MOTOR, 1-SP AUTO
- **TOYOTA PRIUS**
1.8-L I-4 + MOTOR, CVT

†Includes performance-enhancing options.



Smashing NAFTA Apart Is Harder Than It Seems, Especially When You're Blindfolded

UNDERSTANDING THE NORTH AMERICAN FREE TRADE AGREEMENT AND HOW IT HAS COME TO BENEFIT THE AUTO INDUSTRY. BY JEFF SABATINI

ILLUSTRATION BY BRYAN CHRISTIE DESIGN

The tweet from the President-elect came early in the morning, 7:30 a.m., on the first business day of the new year: "General Motors is sending Mexican made model of Chevy Cruze to U.S. car dealers-tax free across border. Make in U.S.A. or pay big border tax."

Compared with other corporate bullying from the most powerful Twitter account on the planet, this one seemed relatively tame. GM is just one of 10 carmakers, including each of the top eight, that assemble vehicles in Mexico destined for dealership lots north of the Rio Grande. The company responded the same day, issuing a similarly brief statement pointing out that it also builds the Cruze here. "All Chevrolet Cruze sedans sold



Unlike a grocery-store piñata, the Mexico-built Chevrolet Cruze hatchback is not filled with disappointing off-brand candy.



GM's Mary Barra, a member of the President's Strategic and Policy Forum, met with President Trump twice in the first two weeks of the administration.

in the U.S. are built in GM's assembly plant in Lordstown, Ohio," it read. "GM builds the Chevrolet Cruze hatchback for global markets in Mexico, with a small number sold in the U.S."

What GM didn't mention is that Lordstown would be dropping a production shift, a byproduct of demand moving from sedans to crossovers. Cutting back from three shifts to two resulted in layoffs later in the month. And even though all the Cruze sedans it is currently producing for the U.S. are coming from Ohio, within the past year GM has imported some sedans from its plant in Ramos Arizpe, Mexico.

Of course, finding nuance in a press release is as likely as expressing it in 140 characters. Last year, GM delivered 188,876 Cruzes in the U.S., and this year it expects the Mexico-made hatchbacks to account for about 15 percent of sales. The Cruze is the company's second-best-selling car here and one of GM's truly global models; plants in Argentina, China, and Korea also build the Cruze. And it offers good evidence of why unraveling the North American Free Trade Agreement after 23 years would prove challenging for the U.S. auto industry.

Economists all but unanimously agree that NAFTA benefits the United States. In a 2012 University of Chicago Booth School of Business survey of dozens of top economists, not one respondent disagreed with the statement that "citizens of the U.S. have been better off with the North American Free Trade Agreement." The domestic auto industry most certainly has.

"Every major auto-production region has a Mexico," explains Kristin Dziczek, director of the Industry, Labor & Economics Group at the nonprofit Center for Automotive Research (CAR). NAFTA has allowed auto manufacturers with large U.S. operations—including the foreign carmakers that manufacture here—to "near shore" some auto assembly and parts manufacture, taking advantage of Mexico's lower labor costs. German carmakers have done the same thing in Eastern Europe; Asia uses China, India, and Thailand for lower labor costs.

Mexico has been particularly beneficial to small-car production or models such as the Cruze where profit margins tend to be as diminutive as the vehicles themselves. A GM spokesman who did not want to speak on the record about NAFTA says that the company was "not going to speculate" on any future tariff scenarios. GM chairman and CEO Mary Barra participated in a January

meeting at the White House where she no doubt pleaded the company line: Decisions about where to build the Cruze and every other GM product were made years ago, and in a capital-intensive business like the auto industry, supply chains are complex.

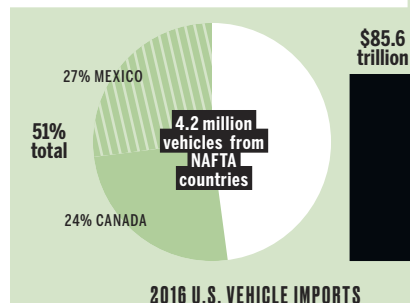
The Cruze's window sticker sheds some light on this complexity. Whether the car is assembled in Mexico or Ohio, 44 percent of its parts come from the U.S. or Canada. Broader trade averages are similar, as the U.S.-sourced content of imported Mexican goods has risen from about 5 percent before NAFTA to 40 percent today. This is reflective of supply chains like those in the auto industry, where parts make multiple border crossings before becoming a car. Having at least 62.5 percent of the content from the three NAFTA countries avoids tariffs. So a Cruze's Monroney sticker, even from a car built in Ohio, will also indicate that 32 percent of its parts are sourced from Mexico, where the booming parts-manufacturing business is as important to manufacturers as final assembly.

This integration of American, Canadian, and Mexican manufacturing into a single supply chain is why judging the relative success of NAFTA is not as easy as, say, counting the increasing number of Mexican auto assembly plants (eight new ones since 2010 with two more to come) and decrying the loss of American jobs. While it is undeniable that automotive-manufacturing employment in the United States has fallen and Mexican employment is up since NAFTA, economists say this has strengthened manufacturing in North America as a whole. It's the familiar "lift all boats" economic theory. Those same economists tend to lay the blame for the loss of American manufacturing jobs overwhelmingly on technology and automation.

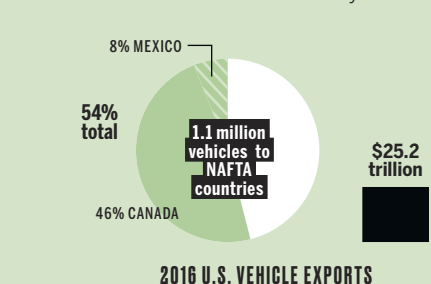
There is a secondary benefit to sending lower-wage jobs south of the border. A 2014 analysis by the Peterson Institute for International Economics concluded that for every 10 percent increase in jobs at a Mexican affiliate there is a corresponding 1.3 percent boost to U.S. employment. Spending on U.S. research and development also increases, by 4.1 percent, which is important because it ensures that those jobs that stay in the U.S. are the higher-wage ones in engineering and related fields.

Following this logic, those Mexico-made Cruze hatchbacks and the Mexican parts in Ohio-built sedans help GM turn a profit so it can keep the lights on at its headquarters in Detroit and invest in places such as Lordstown. GM spent \$50 million in 2014 to upgrade the plant for the second-generation Cruze and dropped a total of \$250 million on the plant since 2009. That's just part of the \$21 billion it says it has invested in its U.S. operations in the past eight

FROM NAFTA WITH LOVE



NAFTA members Canada and Mexico account for more than half of U.S. automotive trade by volume.



DATA FROM THE INTERNATIONAL TRADE ADMINISTRATION, U. S. DEPARTMENT OF COMMERCE

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years. GM's accounting is not an anomaly; according to CAR, investment in Mexico has not come at the expense of the United States so much as the rest of the world, particularly Europe. Since 2009, the U.S. received 73 percent of the \$116.5 billion that automakers poured into North America. "Michigan got more investment dollars than Mexico," says Dzikczek.

CAR predicts possibly dire consequences from busting up NAFTA, which it says would lead to "higher costs to producers, lower returns for investors, fewer choices for consumers, and a less competitive U.S. automotive and supplier industry." And among the likely scenarios it forecasts, one is conspicuously absent: a mass repatriation of jobs from Mexico.

U.S. auto plants operated at 94 percent capacity in 2016, meaning that automakers would be unable to move production here in the short term. Rather, some Mexico-made cars would likely just disappear from our market. GM says that the cost of tooling needed for Cruze hatchback production at Lordstown is not justified by demand for that body style. So no NAFTA would likely mean no hatchback Cruze in the U.S. Also, GM potentially would need to charge higher prices for the Ohio-built sedan if its Mexico-made parts can no longer be imported tariff-free.

In that case, GM might turn to Asia in search of low-cost components. This would have negative consequences for American manufacturers, as it would dramatically reduce the U.S. content of those parts. Chinese goods, for example, generally have one-tenth the U.S. content of those from Mexico. Carmakers that opt to shift production from Mexico elsewhere would also likely target another low-wage country such as China.

Such a move could play out like Honda's migration of the Fit to Mexico, but in reverse. Honda opened its plant in Celaya, Mexico, to produce Fits for North America in 2014. In 2011, high demand in North America and a strong yen led the company to start sourcing Canadian models from its Chinese plant in Guangzhou rather than Japan.

There is another course of action, one that the notoriously slow-to-change auto industry may just choose by default: Wait. Political winds change. And in the meantime, automakers will continue to

lobby Washington. To that end, GM's Barra met with President Trump again in early February, at which time he proclaimed, "I learned a lot about the automobile business." No doubt, then, that he now understands that a model cycle lasts longer than a presidential term.

Honda's plant in Celaya, Mexico, opened in 2014. Toyota is now constructing its own plant down the street, like a Burger King to Honda's McDonald's.



America Last

ON THE FUTILITY OF AMERICAN CARMAKERS SELLING IN JAPAN.

BY MATT JANCER

IT'S A CLAIM we've heard from America's automakers time and time again: The Japanese car market is the most closed in the world. The latest press release from the American Automotive Policy Council (AAPC), a lobbying group for FCA, Ford, and GM, urges Japanese prime minister Shinzō Abe to "open up [Japan's] market in a meaningful way to U.S. cars and trucks." But Japan hasn't had import tariffs on automobiles since 1978.

Japanese buyers drive home 300,000 foreign cars a year out of about 5 million total, yet fewer than 15,000 are American imports. German automakers, which are subject to the same rules as American companies, do much better: BMW sold 46,000 vehicles in Japan last year, Volkswagen moved 55,000, and Mercedes 65,000 units. The numbers for the rest of the global auto industry indicate that maybe American companies are just no good at selling there.

The AAPC sees it differently. "If the import participation rate is at 6.5 percent, there is no other explanation for that but for non-tariff measures," says Matt Blunt, the former Missouri governor who serves as AAPC president and spokesman. The AAPC maintains that Japanese currency manipulation routinely devalues the yen, making imports less affordable. The organization also decries Japanese regulations

and taxes as impediments to doing more business there.

Truly, Japan's auto market is a Galápagos Island of odd species, tilted heavily toward the small, tall, boxy cars that fit Japan's narrow, congested streets and better navigate laws that perennially tax owners on engine size and vehicle weight. This advantages European manufacturers, who sell 117 models in Japan with engines that displace less than two liters, compared with just 10 American models. Altogether, there are 289 European models on sale in Japan, while Americans offer only 24. However, Japan lets any automaker sell 5000 cars each year without meeting its emissions or safety rules.

Of course, there is also the elephant in the room: right-hand drive. GM's whole Japanese business plan is left-hooker Cadillacs, Corvettes, and Camaros, along with a right-hand-drive Chevy Captiva SUV. Annual sales barely hit 1000. FCA's American arm does much better—it sold almost 10,000 vehicles last year—but its whole non-Fiat lineup comprises Jeep and a handful of Chrysler 300s. Ford quit Japan altogether in 2016.

In fact, you could say the Big Three have given up trying. Over the past two decades, Chrysler, Ford, and GM have lost three-quarters of their dealerships there, while European-branded retail points have nearly doubled, according to the Japan Automobile Manufacturers Association. And from 2009 to 2013, Audi, BMW, Mercedes-Benz, and Volkswagen combined to spend 20 times what the American brands did on marketing in Japan. Well, with so few products to sell, there's not much to advertise.

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Suburban Safari

With its newest family hauler, the fifth-gen **Discovery**, Land Rover fully commits to the modern age. *by Daniel Pund*

▼
THE TRUTH ABOUT THE NEW Land Rover Discovery, the fifth in a line of trucks that dates back to 1989, is not revealed on the rocky ledges of southern Utah, nor on the near-whiteout of the road just outside Zion National Park, nor in the blush waves of the Coral Pink Sand Dunes, nor even on the few twisty bits of road we traversed in the new family-oriented Rover. Though the vehicle acquires itself admirably in all of these circumstances.

The essential truth of this five- or seven-seat SUV comes instead from Massimo Frascella, the Discovery's exterior designer, over after-dinner drinks and cigars at a posh resort/bunker in the Southern Utah hinterlands. "The old Discovery was an example of industrial design. The new one is a car design," he says.

As if to highlight this point, Land Rover parked a version of each of the five generations of Discovery on a rock stage outside our hotel. The first two generations were, as Frascella says, industrial; simple folded metal around mechanicals now so rudimentary

[+] Drives as modern as it looks, improved fuel economy and performance.
[-] Ho-hum engines, we'll kind of miss the ol' lug.

and old that we're convinced most of their lubricants were whale-based. The second two, called LR3 and LR4 here in the U.S., were softened versions of the same basic box, modernized and bedecked with luxury doodads but essentially electric typewriters in a computerized world.

The fifth version, which goes on sale in June, doesn't look a bit like those machines. It looks instead like a modern family vehicle executed in the vernacular of Land Rover. Its nose is smooth and eased

back as if eroded by wind. The cabin is pushed rearward and polished soft. The corners are not corners at all, but wide-radius curves. It looks, from the rear, not so much like a Discovery or any other SUV, but like a cargo-carrying cartoon spaceship piloted by the good guys.

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Land Rover has applied to the new vehicle some characteristic Discovery cues such as the stepped roof and off-center rear license plate. But the roof's rise is so gentle as to go basically unnoticed. And the odd placement of the plate is pure affectation since there's no spare tire or eccentric clamshell two-piece tailgate necessitating the location.

And its revolutionary appearance is emblematic of its comportment. The new Discovery is now built from the same aluminum-intensive structure as the Range Rover and Range Rover Sport. That, according to Land Rover, helps the new ute drop around 830 pounds compared with a similarly equipped outgoing LR4. This helps explain the new Disco's improved fuel economy, up 1 mpg in the city and 2 on the highway, compared with the last LR4 equipped with the same supercharged 3.0-liter V-6 engine and eight-speed transmission. At 16 mpg city and 21 highway, the new Discovery still lags competitors from Audi, BMW, and Volvo, but it's an improvement. The gas-engined Disco should drop nearly one second from the zero-to-60-mph time of the old LR4.

That structure has also helped the Discovery join the modern era of family transport. We have vivid recollections of old Discoveries scaring us silly on twisty roads. They handled like a three-legged camel . . . that was standing on its tippy-toes . . . and was drunk . . . and also suffering from an ear infection.

The new version actually kind of handles. In fact, the new Disco's body control is better than the Range Rover's, evidencing none of the tippy feeling that characterizes the first few degrees of roll or dive of the pricier Rover. And that's without any sacrifice in ride quality. We drove only versions with the optional air-spring suspension, so we can't yet speak to the standard steel-coil setup. The electrically assisted steering commands the front tires with reasonable precision. There's a large-ish dead spot on-center that

2017 LAND ROVER DISCOVERY

VEHICLE TYPE: front-engine, all-wheel-drive, 5- or 7-passenger, 4-door hatchback

BASE PRICE: \$50,985–\$59,945

ENGINES: supercharged and intercooled DOHC 24-valve 3.0-liter V-6, 340 hp, 332 lb-ft; turbocharged and intercooled DOHC 24-valve 3.0-liter diesel V-6, 254 hp, 443 lb-ft

TRANSMISSION: 8-speed automatic with manual shifting mode

DIMENSIONS

WHEELBASE: 115.0 in

LENGTH: 195.7 in

WIDTH: 81.6 in

HEIGHT: 73.5 in

PASSENGER VOLUME:

104–139 cu ft

CARGO VOLUME:

9–45 cu ft

CURB WEIGHT:

5150–5300 lb

FUEL ECONOMY

EPA COMBINED/CITY/

HWY: 18–23/16–21/

21–26 mpg

ZERO TO 60 MPH:

5.9–7.6 sec

ZERO TO 100 MPH:

15.4–21.7 sec

1/4-MILE: 14.5–15.9 sec

TOP SPEED:

130–133 mph

FUEL ECONOMY

EPA COMBINED/CITY/

HWY: 18–23/16–21/

21–26 mpg

can cause some busyness on the highway, particularly with heavy crosswinds. And the vehicle's lane-keeping assist is heavy-handed and disruptive. But the steering ratio, at 17.6:1, is quick enough and, once out of the dead zone, the wheel loads up naturally and the Disco carves a consistent arc around corners.

The interior is a calm oasis bereft of wind noise, with comfortable seating for five to seven passengers. While not appreciably larger than the LR4, the interior is a far more pleasant place to be thanks to high-quality materials and a dash design that mimics the Range Rover's. This being the family vehicle of the Land Rover lot, the company has built in multiple storage cubbies (even a small one hidden behind the HVAC control panel) and fitted the thing with up to nine USB ports. The two less expensive trim levels (SE and HSE) come standard as five-seaters, with a \$2150 third-row option. The top-level HSE Luxury model comes only as seven-seater with a power-folding system for the second and third rows, which can be operated from a variety of locations, including your smartphone. We found ample head- and legroom in all seven seating positions.

The huge rear hatch affords easy access to a cargo hold of class-competitive size. The Discovery's higher trims come with a power-folding tailgate panel in the cargo



area that serves as a bench when lowered. It's comfy enough, but when it's in its resting position—vertical and aligned with the rear cargo hatch—it complicates loading, requiring you to first open the hatch and then either lower the panel or lift your groceries over it.

All-wheel drive is, of course, standard on all versions, but the two-speed transfer case and air suspension, required for serious off-roading, add \$1500 on lower-level models. An additional off-road package, including an electronically locking rear differential and All Terrain Progress Control (a sort of off-road cruise control), tacks on another \$1250.

All Discovery models come standard with the 340-hp supercharged 3.0-liter gas V-6, familiar from the LR4 as well as a large

number of other Jaguar Land Rover products. It mates to the excellent ZF eight-speed automatic. The gas engine puts out more horsepower and torque than competitors' six-cylinders but isn't exactly the smoothest or most pleasant-sounding lump. HSE and HSE Luxury versions are available with a 254-hp 3.0-liter turbo-diesel

Above left: Driver and passerby chat about the weather, kids, and impending rollover. Elsewhere on the page: The Discovery nuzzles closer to Range Rover.

V-6, nabbed from the Range Rover. The diesel bolts up to the same eight-speed auto as the gas engine. Were we planning to do a lot of off-roading, we might pay the extra \$2000 for the diesel since its 443 pound-feet of torque eases the slow going. But on the open highway, the diesel-powered Disco had a harder time gathering the necessary speed to pass slow-moving traffic. On the upside, the diesel is rated at a reasonably good 21 mpg city and 26 highway.

The Disco starts at \$50,985. But that's for the entry-level SE, which locks you out of the diesel engine and some luxury and driver-assist options. The mid-level HSE starts at \$57,945. And the HSE Luxury starts at \$64,945 and can push beyond \$80,000 when heavily optioned.

Those prices are not appreciably higher than those of the LR4 the Disco replaces. And for that money, buyers will get a much more pleasant, much more modern conveyance. Surely, some Rover aficionados will eschew the new Disco and its smooth, modern ways. But we suspect a much larger number of folks will consider the new Discovery than ever considered any of the previous ones.





TESTED

Four Play

Equipped with a new, more capable Quattro system, Audi's **A4 Allroad** defies compromise. *—by Josh Jacquot*

▼ **THE TRACKS IN THE VIRGIN POWDER** tell the story: Four of them, each flanked by its own spent roostertail of snow, are hallmarks of all-wheel-drive grace. That Audi's A4 Allroad doesn't perpetually turn the driveshaft that powers its rear axle differentiates it from every Quattro model sold in the U.S. since the original 1983 Quattro Coupe. That all four tires are pulling when needed, however, is apparent from behind the wheel. But the switch from front- to all-wheel drive is an instant, seamless, and transparent transition. Michèle Mouton would be proud.

Audi's former factory driver would also, no doubt, approve of the Allroad's launch-control-assisted 5.2-second stomp to 60 mph, the same as the last A4 sedan we tested and a meaningful second quicker than the similarly purposed Volvo V60 Cross Country T5 AWD. A 13.8-second quarter-mile puts to rest the notion that being a lifted wagon with a modicum of off-road capability also means being, well, slow. Audi's turbocharged 2.0-liter inline-four pumps out the same 252 horsepower and 273 pound-feet of torque here that it does in the A4 sedan, sending it to the seven-speed dual-clutch paddle-shifted gearbox. The transmission remains a highlight of the driving experience: obedient and rapid when you need those traits, benign and invisible when you don't.

But it's the Allroad's Quattro with Ultra system that's the star of this wagon's show. As an on-demand drivetrain, its fuel-saving capability exceeds that of many previous Quattros. Evaluated without the knowledge of its newfound complexity [see sidebar], its capabilities are as easy to trust as an autonomic heartbeat. Not once were we made aware of all that's going on behind the scenes, despite relying consistently on all-wheel drive to pull us confidently through inches of fresh snow, treacherous ice, or sloppy mud. We measured 24 mpg, one less than the EPA's combined rating, but

[+] Improved Quattro capability, as quick as the A4 sedan, brilliant transmission. [-] Cough-up-the-dough sticker, A4-on-Xanax handling.

two better than we saw in the A4 sedan, which uses the older, full-time all-wheel-drive hardware.

Built on Audi's B9 platform, the Allroad wagon shares most of its suspension—its links, bushings, and anti-roll bars—with the A4 sedan. Its wheelbase is virtually identical as well (110.9 inches versus 111.0). It is, however, 2.6 inches taller thanks in part to fixed roof rails. Taller springs that raise the Allroad by 0.9 inch and taller 45-series rubber (another 0.4 inch) are responsible for 1.3 inches more ground clearance. But the Allroad, at heart, still feels like an A4—one with sleepy handling, sure, but with all the sedan's straight-line speed, character, and quality. Adjustable dampers are included with the standard Audi Drive Select, which tailors the Allroad's responses automatically or across its four modes: comfort, dynamic, off-road, and individual.

Selecting the off-road mode locks the Quattro system into all-wheel drive, decreases steering effort, and softens the dampers beyond their comfort-mode settings while disabling Audi's pre-sense collision mitigation and preparation system. It's a virtually imperceptible tweak that's no more dramatic than switching into other drive modes.

Modest lateral grip and turn response are the Allroad's penalties for being tall. All-season Continental ProContact TX rubber sized 245/45R-18 all around lacks the precision and stick of the optional 245/40R-18 Hankook summer tires on the

2017 AUDI A4 ALLROAD

VEHICLE TYPE: front-engine, all-wheel-drive, 5-passenger, 4-door hatchback

PRICE AS TESTED: \$52,625

BASE PRICE: \$44,950

ENGINE TYPE: turbocharged and intercooled DOHC 16-valve inline-4, iron block and aluminum head, direct fuel injection

DISPLACEMENT: 121 cu in, 1984 cc

POWER: 252 hp @ 6000 rpm

TORQUE: 273 lb-ft @ 1600 rpm

TRANSMISSION: 7-speed dual-clutch automatic with manual shifting mode

DIMENSIONS

WHEELBASE: 110.9 in

LENGTH: 187.0 in

WIDTH: 72.5 in

HEIGHT: 58.8 in

PASSENGER VOLUME: 94 cu ft

CARGO VOLUME: 24 cu ft

CURB WEIGHT: 3817 lb

C/D TEST RESULTS

ZERO TO 60 MPH: 5.2 sec

ZERO TO 100 MPH: 13.8 sec

ZERO TO 120 MPH: 22.5 sec

ROLLING START, 5–60 MPH: 6.1 sec

1/4-MILE: 13.8 sec @ 100 mph

TOP SPEED: 128 mph (governor limited)

BRAKING, 70–0 MPH: 152 ft

ROADHOLDING, 300-FT-DIA SKIDPAD: 0.85 g

FUEL ECONOMY EPA COMBINED/CITY/HWY: 25/23/28 mpg

C/D OBSERVED: 24 mpg

Shell V-Power NITRO+
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The Allroad is as close as Americans are going to get to a conventional wagon from Audi. At least its off-roady facade is subtle. Its new fuel-economy-focused all-wheel-drive system operates seamlessly.

Then it'll use its power advantage to disappear. And its 152-foot stop from 70 mph makes other wagons' stopping performances appear downright Flintstones-like.

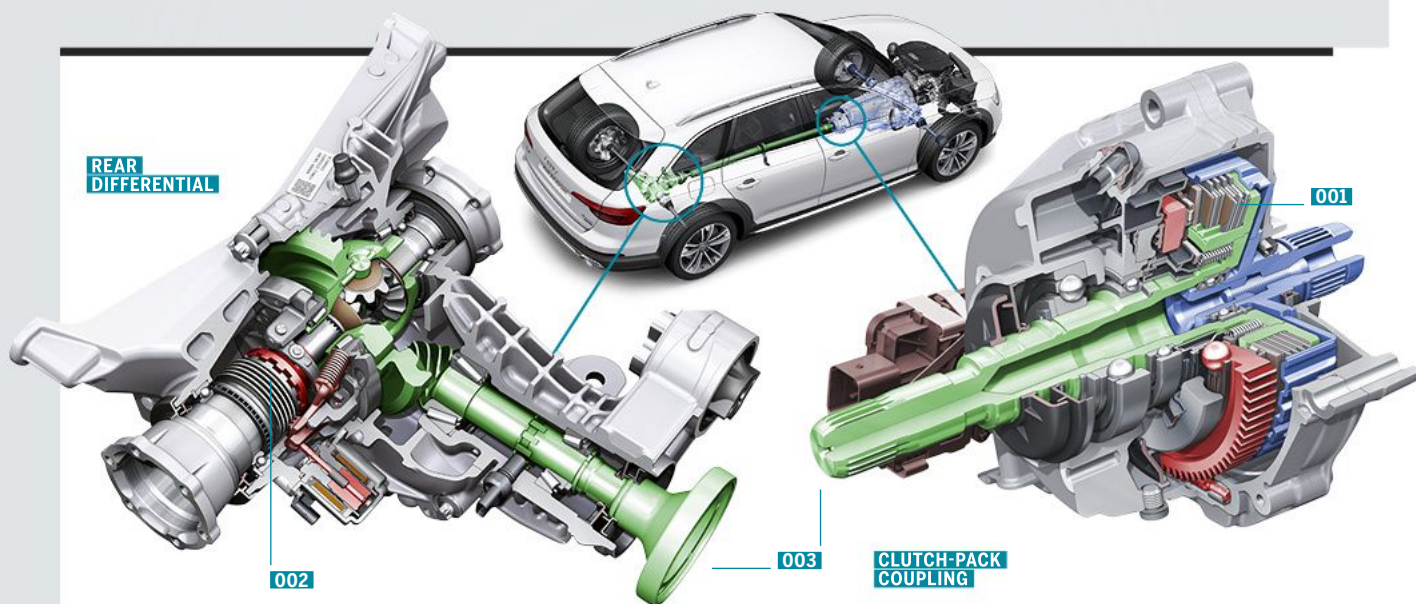
Inside, the Allroad is all Audi all the time—a potent combination of class-leading tech, stunning materials, and mil-spec control feel. The available 12.3-inch “virtual-cockpit” LCD instrument cluster is capable of multiple configurations, including a Google Earth map flanked by tachometer and speedometer gauges. Gray-oak or brown-walnut inlays on the dash, doors, and center console are optional. A 40/20/40 split-folding rear seat is

A4 sedan. The roadholding diminishes from 0.90 g in the A4 to 0.85 g in the Allroad, but even so, there's still a measure of precision here lacking in wagons from Subaru, Volkswagen, and Volvo. In dynamic mode, the Allroad will slay them all on a road with any meaningful twist.

standard. The coherence of the design presents more artfully than the spartan BMW 3-series theme yet is less chichi than Benz's shinier-is-better C-class.

By virtually every measure, Audi's Allroad is the best performing tall wagon sold in America. It's also the costliest. The Premium-trim starter model is priced at \$44,950, \$2255 higher than the base price of Volvo's V60 Cross Country, the only other tall wagon playing in the upscale penthouse. Our Premium Plus test car came with more than \$7000 of add-ons, including tech and cold-weather packages, driving its as-tested price to \$52,625. Lifted wagons from Subaru and Volkswagen start at thousands less and deliver proportionally less performance, tech, and simple yet effective elegance. One demerit: The Allroad has the smallest cargo hold of the currently available wagons, lifted or not.

The new A4 Allroad is still a proper Audi in every sense—capability, presentation, and quality. More important, it's still a Quattro, even if Quattro has evolved.



tech highlight

DUE E QUATTRO

Since Quattro's European introduction in 1980, all-wheel-drive Audis have used many different means to prevent torque from exercising its need for tire-spinning independence. Quattro hardware varies widely by application and is always evolving.

From the lockable center differentials in first-generation Quattros to the later Torsens, viscous, and clutch-type center diffs, each Quattro system offers its own slightly different abilities. In transverse-engine applications, it uses an electronically controlled multiplate clutch to route torque rearward.

Audi's newest system, called Quattro with Ultra, is a significant

departure from previous Quattro drivetrains. It is the first Quattro system capable of idling the rear axle's ring-and-pinion gears and the driveshaft. Two clutches, a multiplate friction clutch (001) on the transmission's output shaft and a toothed dog clutch (002) in the rear differential, open to disengage the drag-inducing components (003), enabling improved fuel economy. The rear

axle is engaged preemptively based on a software model that monitors the way the car is being driven. The outside temperature, yaw rate, steering angle, throttle position, wheel speed, and other parameters are used to determine when to make the switch. A bonus, according to Audi, is that the new system saves nine pounds relative to the Torsen center differential in the A4 sedan.



M Means Something New. Again.

BMW's **M760i** offers twin-turbo V-12 power for only \$156,000. _by John Pearley Huffman

▼
THE BMW M760i xDRIVE is almost an M7. Or within sight of an M7. Or totally close to being an M7. But it's not an M7.

BMW has micro-sliced the "M" designation so thin that it's just causing confusion now. There are "M Sport packages" for regular BMWs and stand-alone "M Performance" options such as the \$650 carbon-fiber mirror caps on the M240i, which, by the way, isn't an M2—that's something else. When BMW uses "M," it can mean different things every time, or several things simultaneously, but the one thing it always means is more money.

What's best about the M760i xDrive is that it *is* different. Here is a big, all-wheel-drive 7-series sedan that loves to slide, a well-upholstered sled engorged with an "M Performance TwinPower Turbo 12-cylinder." This is essentially a 601-hp version of the twin-turbo 6.6-liter V-12 in the Rolls-Royce Dawn, Ghost, and Wraith. It's an engine that pulls like a neutron star and is so quiet it could be operating in the vacuum of outer space. BMW has never produced anything like this before.

Put aside the dispensable hand-gesture techno-dope of the console controls and the optional aromatherapy atmospherics that have been the new 7-series' claims to relevance. Instead, swim in the ocean of torque this V-12 produces. The 590 pound-feet peak breaks like a swell at Cortes Bank with the engine turning just 1550 rpm. The transmission's eight forward gears almost drown under the grunt.

The exhaust note is tunable thanks to the car's muffler flaps that help exaggerate the boosted V-12's sounds. But BMW also ampli-

fies the noise through the audio system.

BMW biases the all-wheel-drive system to mimic rear-drive, sending torque forward via a clutch coupling when the computer deems it necessary. Directional changes are managed with an electrically assisted steering rack lacking substantive feedback. A standard, electronically actuated rear-steering system (optional on lesser 7s) steers the hind wheels up to 3 degrees counter to or with the front wheels, depending on speed. Throw in modestly sized Michelin Pilot Super Sport tires, 245/40ZR-20s in front and 275/35ZR-20s in the rear, and this massive four-door can be tossed around a racetrack with an entertaining, tail-out attitude. Ultimate grip isn't the point of this near-limo; executive-class entertainment is.

The natural comparison here is to Mercedes-AMG's S65, the other big German *Schlachtschiff* with a twin-turbo V-12 under its hood. Mercedes' battleship is broad-shouldered and upright where the BMW 7 is sleeker, more catlike and intimate inside. The staid Mercedes feels as if it's built for the peerage, while the BMW has an insouciant demeanor better aimed at the up-and-coming capitalist class. To oversimplify slightly, the M760i drives smaller than its 206.2-inch length, while the S65 feels every bit of its 208.1 inches.

Then there's the Alpina B7. Technically a product of the Alpina tuning house, the B7 packs a twin-turbo, 600-hp 4.4-liter V-8 in what is otherwise a similar 7-series xDrive sedan. However, the B7's 590 pound-feet peak at 3000 rpm. So there's a personality difference.

BMW claims the M760i will tear to 62 mph in 3.7 seconds, but it's likely to be closer to the B7's mark, hitting 60 mph in 3.5 seconds. That's a freight train to the stars. With that in mind, the M760i is a bargain. At a starting price of \$156,495, it undercuts the AMG S65 sedan by \$73,030. As strange as it is to report, that makes the M760i the cheapest V-12-powered new car available in America. So who cares what the "M" means?



2017 BMW M760i xDRIVE

VEHICLE TYPE: front-engine, all-wheel-drive, 4- or 5-passenger, 4-door sedan

BASE PRICE: \$156,495

ENGINE TYPE: twin-turbocharged and intercooled DOHC 48-valve V-12, aluminum block and heads, direct fuel injection

DISPLACEMENT: 402 cu in, 6592 cc

POWER: 601 hp @ 5500 rpm

TORQUE: 590 lb-ft @ 1550 rpm

TRANSMISSION: 8-speed automatic with manual shifting mode

DIMENSIONS

WHEELBASE: 126.4 in

LENGTH: 206.2 in

WIDTH: 74.9 in

HEIGHT: 58.2 in

PASSENGER VOLUME: 115 cu ft

TRUNK VOLUME: 18 cu ft

CURB WEIGHT: 5250 lb

PERFORMANCE (C/D EST)

ZERO TO 60 MPH: 3.5 sec

ZERO TO 100 MPH: 7.9 sec

1/4-MILE: 11.8 sec

TOP SPEED: 155-190 mph

FUEL ECONOMY

EPA COMBINED/CITY/HWY: 16/13/20 mpg

Drivelines

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Theater of the Absurd

At the intersection of tall, powerful, preposterous, and breezy sits the Mercedes-Maybach **G650 Landaulet**.
_by Juergen Zoellter

▼ **DON'T BLAME THE CHINESE FOR THIS ONE**, because they prefer to sign business contracts in the curtained rear compartments of stretched limousines. No, this neo-NATO army ram absurdly repurposed as a *recherché* pleasure barge is a love letter to show business and the even more decadent show-off business. It's for rap stars and Russian oligarchs and Middle East princes with a falcon on each arm who want to see and be seen for exactly as long as the security team holds the perimeter.

The off-one's-trolley Mercedes-Maybach G650 Landaulet (the label denotes a folding roof over the rear seat) is probably the most capable and ultraluxurious stock off-road convertible on earth, which is a market that is going to take off any second now. Only 99 will be built for Mercedes by G-wagen subcontractor Magna Steyr in Graz, Austria, with a price tag of about \$550,000. Those with the means to purchase one are unlikely to be deterred by the fact that Mercedes will not officially sell the Landaulet in the States. The national owner's club meetings will be intimate affairs.

This overweight Chris-Craft of the savanna, this parade float from the Association of Unabashed 0.1-Percenters, is a hodgepodge of Mercedes bits from the platinum parts bin. It takes most of its mechanicals and cockpit from regular G models, but the two-seat rear compartment is from the Mercedes-Maybach built on the long-wheelbase S-class. The folding fabric roof was pried off the short-wheelbase G convertible, the one we don't get in the U.S., but it has been reupholstered for better noise isolation.

To suss out the vehicle's technical capability and luxury features, we drove this 3.7-ton—oh, sorry, it has carbon-fiber wheel arches, so that's 3.698-ton—brick through the Madikwe Game Reserve in South Africa, close to the Botswana border, where an ample supply of the continent's big game could be spied over the power-folded roof. First impression: Despite trepidations about riding in the back of what must look to a lion like a self-propelled dim sum cart, we proved to be not the kind of prey that the animals prefer. The powerful, low-frequency sound of the AMG twin-turbo 6.0-liter V-12 under load only made the lazy cats turn their heads, and it left the leader of an elephant family wagging its ears. The Landaulet's voice is less aggressive than that of the regular AMG G65 and is completely different from the diesel-powered Land Cruisers and Land Rovers that normally shuttle tourists in this park.

The Maybach G650 continues a Mercedes landaulet tradition that started in

[+] Wind in the hair, portal axles under foot, twin-turbo V-12 power. Exclusivity on Adderall.
[-] Diminishing the world's supply of portal axles, turbocharged V-12s, and locking differentials for celebrity taxis feels wrong.

Drivelines



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1910 with the Benz 25/45 PS Landulet and continues, however absurdly, today [see sidebar]. While the G650 Landulet may be the redneck-Billy Bob scion of this illustrious family, it is not without its assets. As with all lesser G-wagens, the Landulet needs more to be conquered than to be driven; driving it is a lot of work. It never aims where the driver wants it to go due to the imprecise recirculating-ball steering and the jumpy, stiff suspension, which makes executing small directional changes tough. Considering the G-class has been in production since 1979, a certain antique feel is to be expected.

With another 22.8 inches inserted into the G-wagen's wheelbase, sitting in back of the Landulet is like traveling in the legendary Orient Express, but with a stiffer breeze and better visibility both for the occupants and their onlooking fans and/or paid assassins. It's a luxury travel compartment back there, with the cargo pampered by two Maybach power couches with various massage functions. Mercedes' "Hot-Stone Massage" is standard; the multiple heated air chambers can be periodically inflated and deflated to erase the tensions of yet another gilded day. The massage works so smoothly that one German with us suggested it be called "Hot-Balloon Petting," because, well, Germany. The driver and park ranger in the front seats can be walled off

Top right: Zebra thinks, "Hey, that could be a good next car for me." **Above center:** Flutes sound an alarm when filled with anything less than Pol Roger '75.

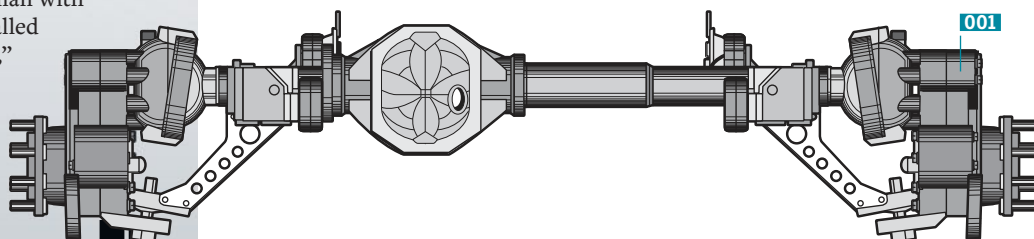
during this spa treatment by raising a glass divider between the front and rear compartments. This power window will even turn opaque gray at the push of a button to allow you to pet your hot balloons in privacy. The technology is well-known from the S-class coupe's glass roof and relies on a magnetic interlayer between the two glass panes.

Two retractable steps at the side skirts of the ute slide out on electric power. As soon as a door opens, the step automatically swings out and allows everyone, and especially women in evening wear, a dignified descent from this super-G's high floor. Separating both seats in the rear is a huge "business" center console, though it contains two champagne flutes and bottle holders for getting the hot-balloon business really rolling. And there are two folding tables for, um, card games. Yes, that's it. Every seat comes with a remote control and a headset for individual entertainment programs on separate monitors, mounted in front of the glass divider.

tech highlight

THE TORQUE WHISPERER

Portal axles allow increased ground clearance by raising the axle input above the center of the wheels via a gearbox at the ends of each axle housing (001). Because gear reduction can be accomplished in the axle-end gearboxes, the half-shafts are subjected to lower loads. There are two downsides: increased cost and unsprung weight. Neither will concern Landulet owners.



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HaulMaster

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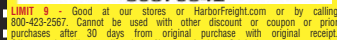
MOVER'S DOLLY
ITEM 60497/93888 shown
61899/62399/63095/63096
63098/63097

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★★★★★

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RAPID PUMP® 3 TON LOW PROFILE HEAVY DUTY STEEL FLOOR JACK

ITEM 61282 shown
61253/62326

• Weighs 73 lbs.



Customer Rating
★★★★★

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~~\$84.99~~
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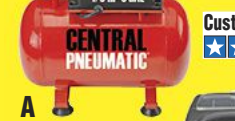


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CENTRAL PNEUMATIC

3 GALLON, 100 PSI OILLESS AIR COMPRESSORS

A. HOT DOG
ITEM 69269/97080 shown
B. PANCAKE
ITEM 95275 shown
60637/61615



Customer Rating
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20 TON SHOP PRESS

• Pair of Arbor Plates Included

ITEM 32879
60603 shown



Customer Rating
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\$14.99

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drillmaster

ITEM 69651
62868/62873
62839 shown



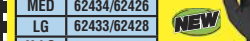
Includes one 18V NiCd battery and charger

Customer Rating
★★★★★

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MECHANIC'S CHOICE SHOP TOWELS - PACK OF 50



SAVE 44%

Customer Rating
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COVER PRO

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69034/62858 shown



Customer Rating
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WARRIOR

29 PIECE TITANIUM NITRIDE COATED HIGH SPEED STEEL DRILL BIT SET



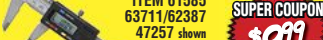
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61637 shown

Customer Rating
★★★★★

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SIZE ITEM
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LG 62433/62428
X-LG 62432/62429



Customer Rating
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Customer Rating
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PITTSBURGH

6" DIGITAL CALIPER

ITEM 61585
63711/62387
47257 shown

Customer Rating
★★★★★

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CENTECH

2.4" COLOR LCD DIGITAL INSPECTION CAMERA

ITEM 61839/62359 shown

Customer Rating
★★★★★

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The top can be raised and lowered with a button in the rear. We expect this button to be used liberally, as the views out the side and back are heavily restricted by the roof pillars. And, of course, the best view from the G Landaulet is definitely achieved by standing up, following the example of Francis in his Popemobile, which is also an exclusive version of the G model (when it's not a very un-exclusive Fiat 500L). The development team under G boss Gunnar Güthenke conveniently mounted four grab handles per rear passenger. Standing up allows passengers to also better tolerate the short, sharp shocks caused by a gravel road, shocks that the suspension's dampers do not damp. Because they're mounted directly over the rear axles, even the supremely cushy and comfortable Maybach thrones can't soak up these impacts.

With its 325/55R-22 tires enjoying full traction on pavement, the 621-hp, 17.5-foot-long G650 Landaulet will go from zero to 60 mph in less than six seconds, claims Güthenke. The impressive acceleration is accompanied by smooth gearchanges through the seven-

King of the Hammers meets the Pope-mobile. Possibly, the G650 is the first landaulet to offer meaningful river-fording capability.

speed automatic. Top speed is limited to 112 mph so as not to flay to pieces the canvas roof or suck other people out of their cars. In spite of the airliner-spec braking system, the heavy Landaulet needs an appropriate braking distance if one is to avoid sparking a peasant revolution.

Like all G models, the Landaulet comes with permanent all-wheel drive and three differentials that can be locked. To raise its off-road capability even further, portal axles—such as those on the G500 4x4² and the special series G63 6x6 before it—guarantee extra ground clearance while tracing fresh cheetah tracks. Whether G650 Landaulet customers will use their vehicles for this purpose is difficult to say. But if you are very lucky, you may just spy a celebrity or two cruising around in the rear seats furiously petting their hot balloons.

2018 MERCEDES-MAYBACH G650 LANDAULET

VEHICLE TYPE: front-engine, all-wheel-drive, 4-passenger, 4-door landaulet

BASE PRICE: \$550,000 (est)

ENGINE TYPE: twin-turbocharged and intercooled SOHC 36-valve V-12, aluminum block and heads, port fuel injection

DISPLACEMENT: 365 cu in, 5980 cc

POWER: 621 hp @ 5300 rpm

TORQUE: 738 lb-ft @ 2300 rpm

TRANSMISSION: 7-speed automatic with manual shifting mode

DIMENSIONS

WHEELBASE: 135.0 in

LENGTH: 210.4 in

WIDTH: 82.7 in

HEIGHT: 88.0 in

CURB WEIGHT: 7300 lb

PERFORMANCE (C/D EST)

ZERO TO 60 MPH:

5.8 sec

ZERO TO 100 MPH:

16.4 sec

1/4-MILE: 14.5 sec

TOP SPEED: 112 mph

great moments in toplessness

FROM COACH-BUILDING TO ROCK CRAWLING

Through the 1930s, when luxury cars often wore bodies created by contract coach houses, Benz, Daimler, Daimler-Benz, and Maybach offered many landaulet (semi-convertible) body styles. Postwar, landaulets arrived in much smaller numbers. Here are some of the more famous examples:

001 1936–1940: 260D Pullman-Landaulet (W138). These were popular taxis back then. Good Uber cars now.

002 1960–1961: Type 300d Pullman-Landaulet (W189), two built, one specifically for the Vatican.

003 1966: 300SEL Landaulet (W109).

004 1967–1981: 600 Pullman-Landaulet (six doors, W100), 26 built.

005 1997: S500 long-wheelbase landaulet (W140), one built for Pope John Paul II.

006 2012: Mercedes-Maybach G2S (V240). Fewer than 10 sold in the U.S.



001



002



003



004



005



006

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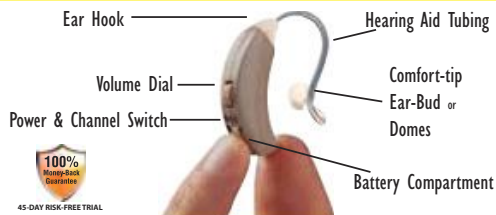
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"I have had this aid two days and all I can say is WOW!" --Teresa H., Grove, NJ



TESTED

More Traction, Less Satisfaction

The 2017 Dodge **Challenger GT AWD** is proof that you can teach an old pony new tricks. **—by David Beard**

▼ **AN AMERICAN MUSCLE CAR** without burnouts? What's next, a Fourth of July without fireworks? Barbecues without beer? Football without repetitive brain trauma? That's exactly what Dodge is proposing with its all-wheel-drive Challenger GT. It robs any hope of a rear-tire fire, trading old-school juvenile fun for modern all-weather traction. It's a segment first—and a potentially wise move to rescue sinking muscle-car sales with all-season utility.

To turn a pony into a mountain goat, the Challenger receives the driveline hardware found in its sibling, the Charger SXT AWD. The addition of a driven front axle and accompanying componentry increases the overall mass by 157 pounds, bringing the total to a whopping 4103. At least the modified Charger police-cruiser suspension does a noteworthy job of handling the additional weight. The steering is responsive, and the side-to-side athletics are well mannered even as the all-season tires howl through apexes. Controlling body roll comes with compromise, however, as the overall ride is firm and busy over undulating surfaces. That said, the tall, 55-series tires diminish harsh impacts relative to the 40- and 45-series rubber on higher-spec Challengers.

Calling this Challenger the first all-wheel-drive muscle car may be a bit of a stretch, though, since it's not all that muscular. Powered by FCA's familiar 305-hp Pentastar V-6, the steel horse makes it through the quarter-mile in 14.8 seconds. Though launch control is featured in the Uconnect infotainment Performance Pages, it's a ruse. A 3500-rpm launch can be selected, but the torque converter limits engine speed to 2500 rpm while stationary, creating an uneventful dash from zero to 60 mph in 6.3 seconds. Despite its new-found traction, the acceleration times are actually slower by 0.1 second to 60 and through the quarter-mile when compared with rear-wheel-drive V-6 models, which means the Challenger GT is the slowest of the current generation of Big Three pony cars, even lagging behind the turbocharged

[+] All-season performance, spacious interior, retro styling.
[–] A little on the portly side, no V-8, no manual transmission.

four-cylinder versions of the Ford Mustang and Chevrolet Camaro.

Torque is routed solely through an eight-speed automatic transmission; a manual is not available. The all-wheel-drive system, capable of decoupling the front axle to reduce parasitic loss and increase efficiency, favors rear-drive most of the time. When the temperature dips into winter-like readings, or when the computer detects wheelslip, a clutch seamlessly engages the propshaft, sending up to 38 percent of the available torque to the front axle. The activation of sport or manual shifting mode will also lock the system into all-wheel drive. Here in Michigan, where winters sometimes last into spring, we confirmed what the system advertises: all-weather performance. The front tires are eager to provide additional bite in icy conditions, and, if one desires, well-controlled slides can be performed.

Outside, the Challenger's bulky proportions and retro looks remain unchanged. The GT's standard 19-inch wheels house front rotors that are one inch larger than those on SXT trims, although any benefit is lost to the all-season rubber. Our GT required 176 feet, 14 more than the last Challenger SXT we tested, to stop from 70 mph.

Starting at \$34,490, the GT offers a higher degree of four-season capability than its Ford and Chevy competitors. But selling the soul of the American muscle car to gain cold-weather practicality feels a little like trading glory for comfort. We'd stick with a rear-drive V-8 and swap to winter tires when the frost settles.

2017 DODGE CHALLENGER GT AWD

VEHICLE TYPE: front-engine, all-wheel-drive, 5-passenger, 2-door coupe
PRICE AS TESTED: \$39,465
BASE PRICE: \$34,490
ENGINE TYPE: DOHC 24-valve V-6, aluminum block and heads, port fuel injection
DISPLACEMENT: 220 cu in, 3605 cc
POWER: 305 hp @ 6350 rpm
TORQUE: 268 lb-ft @ 4800 rpm
TRANSMISSION: 8-speed automatic with manual shifting mode
DIMENSIONS
WHEELBASE: 116.2 in
LENGTH: 197.9 in
WIDTH: 75.7 in
HEIGHT: 57.5 in
PASSENGER VOLUME: 94 cu ft
TRUNK VOLUME: 16 cu ft
CURB WEIGHT: 4103 lb

C/D TEST RESULTS

ZERO TO 60 MPH: 6.3 sec
ZERO TO 100 MPH: 16.3 sec
ZERO TO 130 MPH: 35.4 sec
ROLLING START, 5–60 MPH: 6.7 sec
1/4-MILE: 14.8 sec @ 95 mph
TOP SPEED: 131 mph (governor limited)
BRAKING, 70–0 MPH: 176 ft
ROADHOLDING, 300-FT-DIA SKIDPAD: 0.86 g
FUEL ECONOMY
EPA COMBINED/CITY/HWY: 21/18/27 mpg
C/D OBSERVED: 20 mpg

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Industrial, Heavy, and Magic

Bentley's **Continental Supersports** returns with 750 pound-feet of torque and, should you prefer, a folding top. *—by Kevin A. Wilson*

▼ **THE BENTLEY CONTINENTAL SUPERSPORTS** weighs more than 5000 pounds but should outrun a Chevy Corvette Stingray to 60 mph. That incongruity was only accentuated by its preternatural calm as it did ridiculous things on our first drive in Portugal.

Its maker claims that the coupe needs only 3.4 seconds to hit 60 mph, matching our test of a 707-hp Dodge Charger SRT Hellcat. Yet there's minimal drama in this special-effects movie. Tapping into its deep well of torque, the car surges forward and keeps at it. Aerodynamic resistance calls a halt at a claimed 209 mph (205 for the convertible), making this the speediest Bentley ever, a suitable capstone for the Conti GT's 15th year of production in 2018. The first coupes, starting at almost \$300,000, will be 2017s; the convertible, nearly \$330,000, joins for 2018. There will be 710 in all, with 250 destined for America. Bentley built 1800 of its second-gen Supersports (the first was a 1925 model) from 2009 to 2012, tuning its twin-turbocharged 6.0-liter W-12 to 621 horsepower.

Starting with the GT Speed and its 633-hp W-12, the engineers bumped output to 700 horsepower for the Supersports, using bigger turbochargers, a reworked intake system, and revised intercoolers. Other upgrades include a freer-flowing exhaust that crackles with backfires during downshifts. The ZF eight-speed automatic's torque converter locks up more quickly, carbon-ceramic brake rotors are standard, and the firmer air-spring suspension rides 0.1 inch lower.

The big 12 remains smooth and eager to rev to its 6250-rpm redline, but the 750 pound-feet of torque from 2050 rpm dominates its character. It emits an authoritative roar in bass tones, but it's not melodious.

One obvious special effect comes from the brake-based torque-vectoring system Bentley only offered before on the 2015 V-8-powered GT3-R, of which it built 300 copies. The all-wheel-drive Continental

coupe weighs about as much as a Porsche Cayenne Turbo S and is said to carry 58 percent of its mass on the front axle. Nimble was never in the Continental's vocabulary, but torque vectoring helps it turn.

Lapping the Estoril circuit still demands deliberation; you brake in straight lines and don't floor the throttle until the exit is lined up. Anything else induces tire-squealing understeer. The brakes do a great job from 150 mph but smoke profusely after four laps. This is a fast GT, not a track-day special. On back roads and highways around Lisbon, the Supersports couples supernatural speed with assuring stability, even on narrow two-lane roads.

Special editions must look special, and the Supersports declares itself with a decklid wing (it can be deleted). Black exterior trim and checkered-pattern carbon-fiber cabin décor dress it up. Bentley also touts tri-tone upholstery in which the third color provides a "signature in Alcantara." In red, white, and black, it looks like an expensive bowling shoe. Choose among 17 leathers, and replace the carbon fiber with one of several wood veneers, or go full-custom via the Mulliner personalization program. All those choices, yet half of American buyers just drive home in a Bentley from dealer stock.

No Bentley offers immediate gratification better than the Supersports, but it's one old analog dog. The oil baron seeking a digitized spaceship to help him drive to Mar-a-Lago might prefer the Mercedes-AMG S65 coupe. We like this.

2017/2018 BENTLEY CONTINENTAL SUPERSPORTS

VEHICLE TYPE: front-engine, all-wheel-drive, 4-passenger, 2-door coupe or convertible

BASE PRICE: \$299,000–\$328,000 (est)

ENGINE TYPE: twin-turbocharged and intercooled DOHC 48-valve W-12, aluminum block and heads, port fuel injection

DISPLACEMENT: 366 cu in, 5998 cc

POWER: 700 hp @ 5900 rpm

TORQUE: 750 lb-ft @ 2050 rpm

TRANSMISSION: 8-speed automatic with manual shifting mode

DIMENSIONS

WHEELBASE: 108.1 in

LENGTH: 189.7 in

WIDTH: 76.5–76.7 in

HEIGHT: 54.7–54.8 in

PASSENGER VOLUME: 86–89 cu ft

TRUNK VOLUME: 9–13 cu ft

CURB WEIGHT: 5050–5400 lb

PERFORMANCE (C/D EST)

ZERO TO 60 MPH: 3.4–3.7 sec

ZERO TO 100 MPH: 7.3–7.7 sec

1/4-MILE: 11.6–12.0 sec

TOP SPEED: 205–209 mph

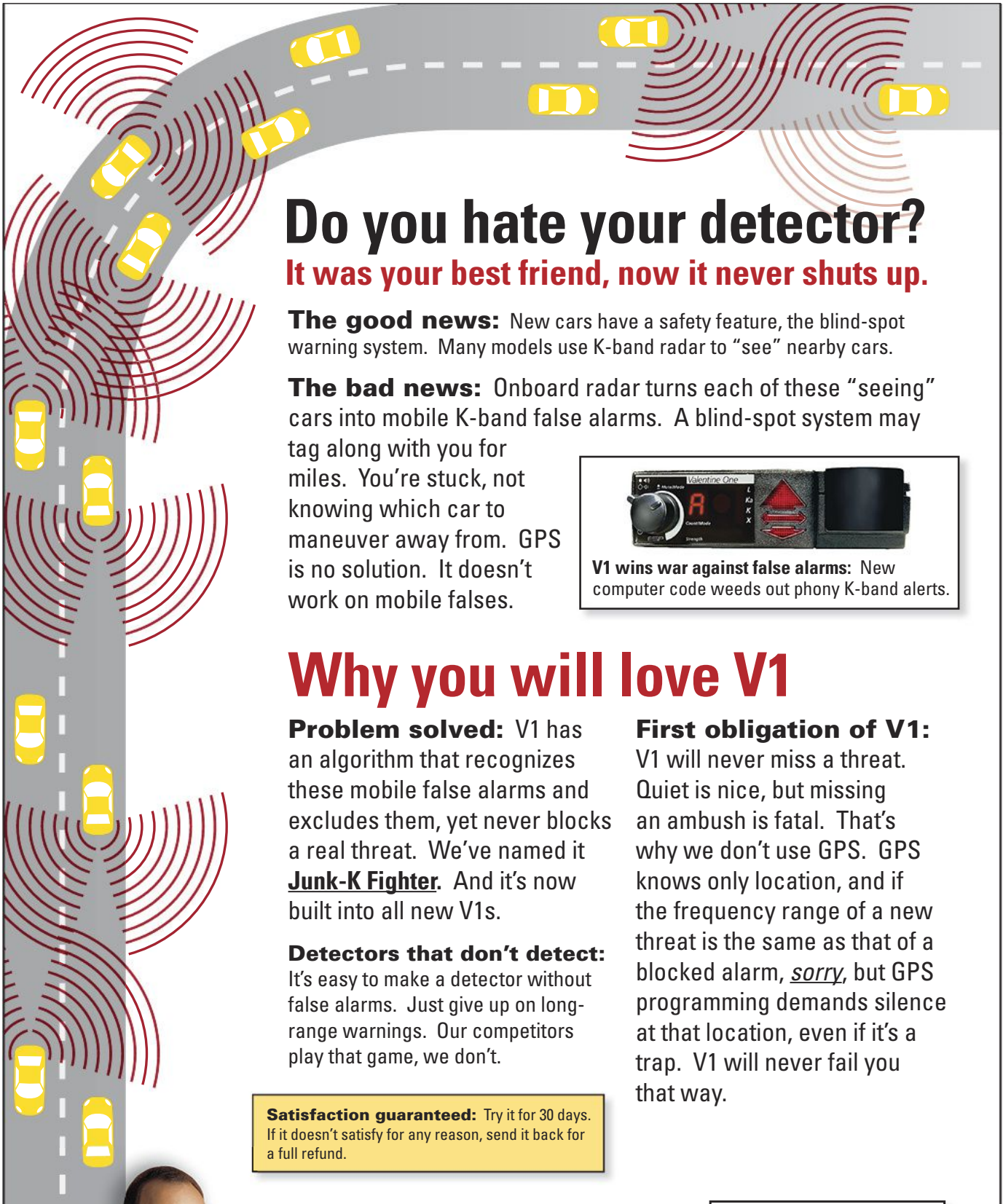
FUEL ECONOMY

EPA COMBINED/CITY/HWY: 13–14/11/19–20 mpg

(C/D est)

[+] Turbo 12's torque shades the Hellcat's, effortless speed, serious brakes.
[–] Cost shades presidential vacations, tri-tone cabin is one tone beyond tasteful, cheesy wing.

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Braking Bad

Porsche's revised **Panamera E-Hybrid** has an all-new mission. *—by Erik Johnson*

▼ **IN THE PAST**, Porsche hybrids had a mission split between upholding a dynamic pedigree and sipping fuel. But the 918 Spyder hypercar marked a shift: Porsche now says hybridization means making its kick-ass cars kick more ass, with electrification's efficiency and emissions benefits subordinate to boosting performance.

The new Panamera 4 E-Hybrid has the numbers to support the new philosophy. Combined output in the plug-in Panamera is 462 horsepower and 516 pound-feet of torque, up from 416 and 435, respectively, in the outgoing model. We estimate this new version will hit 60 mph in 4.2 seconds, almost a full second quicker than its predecessor.

Credit a powertrain overhaul. An eight-speed dual-clutch transmission enables snappier shifts than the old planetary-gear unit, and all-wheel drive is standard where the previous Panamera hybrid was rear-drive only. A 14.1-kWh battery pack offers 50 percent greater capacity than before, and the electric motor/generator—still sandwiched between the engine and the transmission—is stronger by 41 horses and 66 pound-feet. The engine remains a V-6 of similar output, but it's a new, twin-turbo 2.9-liter rather than a supercharged 3.0.

The Panamera's powertrain systems are well integrated, the transition from EV to hybrid operation and back being practically undetectable. Porsche says the E-Hybrid can cover up to 31 miles on electricity alone, where it delivers a torquey and mostly serene experience save for some electric-motor whine and an occasional

but prominent thrum through the floor. Sport and sport-plus modes keep the V-6 lit to maintain or replenish charge, ensuring ample boost for back-road romps.

Whatever the mode, the E-Hybrid offers disciplined body control, grand-touring grace, and a well-sorted ride even in the standard air-spring suspension's sportiest settings. There's no lolling in corners, the steering is responsive, and effort builds predictably, with no peaks or valleys. Like every second-gen Panamera, it's gorgeous, with a swanky interior featuring a center stack lined with glossy info screens, capacitive-touch switches, and haptic controls that push back or vibrate to confirm inputs. Missteps include information submenus that make finding functions difficult and superfluous touchscreen control of the central vent.

There's also the braking system. The pedal sometimes pulses, ABS-like, under even light applications and sporadically returns varying braking force under steady pressure during a single stop. Owners may get used to its quirks, and the brakes get more predictable when past the regenerative function and into the friction system, but this stopping situation is a glaring fault in a Porsche, even a hybrid—all the more so since the car is otherwise extremely well realized.

The E-Hybrid delivers juiced performance, sure, but it weighs an additional 661 pounds—that's three newborn elephants—versus the quicker and nimbler (and nonhybrid) 4S, which costs only a few thousand more when comparably equipped and has 440 horsepower. So why does this hybrid exist?

[+] Gorgeous interior, seamless hybrid system, quick and capable.
[-] Unpredictable brake response, ergonomic quirks, occasional Millennium Falcon sounds.

Europe, for one reason, where regulations, public-charging subsidies, and meaningful tax incentives for purchasers have fostered an aggressive rollout of plug-in hybrids across all segments. It also blazes a trail for truly unhinged electrified Porsches such as the recently announced 680-hp Panamera Turbo S E-Hybrid and the expected plug-in 911—cars that will put a real jolt into Porsche's performance-hybrid strategy.

2018 PORSCHE PANAMERA 4 E-HYBRID

VEHICLE TYPE: front-engine, front-motor, all-wheel-drive, 4-passenger, 4-door hatchback

BASE PRICE: \$100,650–\$105,150

POWERTRAIN: twin-turbocharged and intercooled DOHC 24-valve 2.9-liter V-6, 330 hp, 331 lb-ft; permanent-magnet synchronous AC electric motor, 136 hp, 295 lb-ft; combined system, 462 hp, 516 lb-ft

BATTERY: liquid-cooled lithium-ion, 14.1 kWh

TRANSMISSION: 8-speed dual-clutch automatic with manual shifting mode

DIMENSIONS
WHEELBASE: 116.1–122.0 in
LENGTH: 198.8–204.7 in
WIDTH: 76.3 in

HEIGHT: 56.0–56.2 in
PASSENGER VOLUME: 96–102 cu ft

CARGO VOLUME: 14 cu ft

CURB WEIGHT: 5100–5300 lb

PERFORMANCE (C/D EST)

ZERO TO 60 MPH: 4.2–4.3 sec

ZERO TO 100 MPH: 11.0–11.2 sec

1/4-MILE: 12.9–13.1 sec

TOP SPEED: 172 mph

FUEL ECONOMY EPA COMBINED: 52 MPGe/27 mpg (battery charged/depleted, C/D est)

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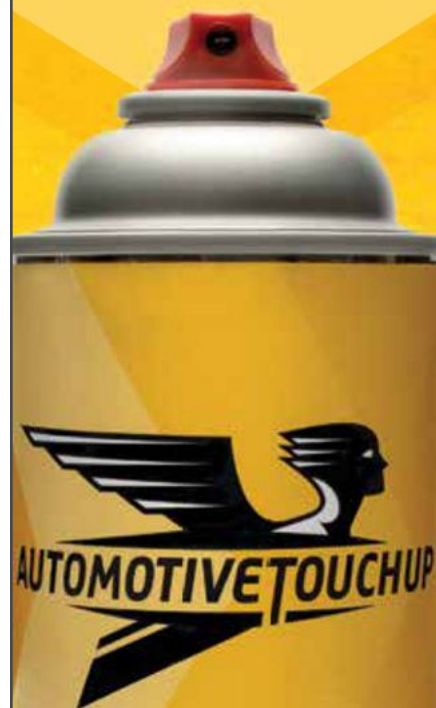
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TESTED

On the Shoulders of Giants

From the creator of the 510 and the SE-R comes the Nissan **Sentra NISMO**. Legacy beware. *—by Jared Gall*

▼ **NISSAN LOYALISTS** know that “NISMO” is a portmanteau for “Nissan Motorsports,” while to everyone else it is very nearly meaningless. And the brand is almost as empty of product as the word is of meaning. It’s a little extra snowcap on the towering mountain of power that is the GT-R. It’s wheels and a wing on the 370Z. It’s some extra weird on top of the pile of weird that is the Juke. But alas, in the Sentra, NISMO starts to assume real significance.

That is, assuming you avert your gaze from the engine room, where the NISMO carries the same turbo 1.6-liter as the equally new Sentra SR Turbo, with 188 horsepower and 177 pound-feet of torque. Instead, focus on the NISMO’s reinforced cowl, floorpan, and rear bulkhead. Notice the new rear dampers, and the revised tuning of the front struts and electrically assisted power steering. The Michelin Pilot Sport A/S 3+ tires, in size 215/45ZR-18, are an inch larger and 10 millimeters wider than what’s available on any other Sentra.

There’s also a lot of red. Or, as the Italians would say, *rosso*. (Or in German, *rot*.) There are red accents on the front and rear fascias, and on the rocker panels, mirrors, steering wheel, seats, and center console. Heck, even the O in NISMO, the taillight lenses, and the honeycomb in the catalytic converters glow red. (That last one’s a guess.) And if you were wondering how, if the entire tach is red, it can indicate where redline is, Nissan has your answer: It turns

dling skews more toward understeer than neutrality, but the car’s reflexes are sharp enough that it’s still fun. The steering is weighty and quick—if devoid of feel—and the pedal calibrations make it so easy to heel-and-toe that you’ll find yourself doing it unconsciously every time you even brush the brake pedal rolling into a lazy 45-mph curve or easing up behind a tractor-trailer on a crowded freeway. If all you do is stomp the middle pedal, the Sentra NISMO will stop from 70 mph in just 156 feet, which would have tied it for the win in our last test of \$40,000 scorching hatches.

The speed is harder to come by than it is to dissipate. The 1.6 needs to wrap most of the way around the tach in first before meaningful power arrives, but the thrust is consistent from there on, and the gears in the six-speed manual (a CVT is available) are spaced such that the engine drops right back into the meat of the torque curve with every red-hash-mark shift. It’s satisfying to hustle, if slow; 7.0 seconds pass before 60 mph arrives. And it does need more rip in the exhaust note, for as is, there are dairy-barn levels of mooing. There are other specters of cheapness. In the example tested here, pressing the steering-wheel-mounted radio and cruise-control buttons honked the horn. And the headliner had a mouse-fur look to it not seen since GM’s darkest days.



[+] Engaging powertrain and chassis, a marked improvement of the Sentra.
[–] The styling of 2017 wrapped around a 1980s GM interior, it’s not a VW GTI.

from solid red into red hash marks. Duh.

But the hue does come with benefits. The seats it adorns are tremendously comfortable and supportive, having been designed with real humans in mind (and not just the slender jockeys most automakers chasing a sporting clientele imagine as their buyers). The NISMO’s ride is well controlled and comfortable, tauter than that of a Volkswagen GTI but without punishing the occupants. The handling

skews more toward understeer than neutrality, but the car’s reflexes are sharp enough that it’s still fun. The steering is weighty and quick—if devoid of feel—and the pedal calibrations make it so easy to heel-and-toe that you’ll find yourself doing it unconsciously every time you even brush the brake pedal rolling into a lazy 45-mph curve or easing up behind a tractor-trailer on a crowded freeway. If all you do is stomp the middle pedal, the Sentra NISMO will stop from 70 mph in just 156 feet, which would have tied it for the win in our last test of \$40,000 scorching hatches.

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While the \$25,855 NISMO is a huge improvement over other Sentras, it’s no better than any of its competition, which includes some of the best performance values on the market—Volkswagen GTI, Ford Focus ST, even the Mazda 3. But it’s a strong indicator that NISMO might take on a deeper meaning for the brand’s mainstream cars. And what it means more than anything else is that we’d like to see how good NISMO could make the Sentra if the Sentra itself were a better starting point. ■

2017 NISSAN SENTRA NISMO

VEHICLE TYPE: front-engine, front-wheel-drive, 5-passenger, 4-door sedan
PRICE AS TESTED: \$27,570
BASE PRICE: \$25,855
ENGINE TYPE: turbocharged and intercooled DOHC 16-valve inline-4, aluminum block and head, direct fuel injection
DISPLACEMENT: 99 cu in, 1618 cc
POWER: 188 hp @ 5600 rpm
TORQUE: 177 lb-ft @ 1600 rpm
TRANSMISSION: 6-speed manual
DIMENSIONS
WHEELBASE: 106.3 in
LENGTH: 183.6 in
WIDTH: 69.3 in
HEIGHT: 58.9 in
PASSENGER VOLUME: 96 cu ft
TRUNK VOLUME: 15 cu ft
CURB WEIGHT: 3043 lb

C/D TEST RESULTS

ZERO TO 60 MPH: 7.0 sec
ZERO TO 100 MPH: 17.5 sec
ZERO TO 120 MPH: 29.1 sec
ROLLING START, 5–60 MPH: 7.9 sec
1/4-MILE: 15.4 sec @ 94 mph
TOP SPEED: 131 mph (drag limited)
BRAKING, 70–0 MPH: 156 ft
ROADHOLDING, 300-FT DIA SKIDPAD: 0.88 g
FUEL ECONOMY
EPA COMBINED/CITY/HWY: 27/25/31 mpg
C/D OBSERVED: 25 mpg

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What I'd Do Differently

Ed Welburn, 66

Last year, Welburn concluded his career at GM as the VP of design. He now runs the Welburn Group, where his desk sits next to his silver '57 Corvette.

► interview by JOHN PEARLEY HUFFMAN



C/D: What was the first thing you designed that you saw go into production?

EW: I'll never forget it. It was a taillamp for a Pontiac Grand Ville. I was in my rookie year. I think it was a '75.

■ As you matured as a designer, did you find any challenges that were tough for you but easier for some of the younger designers?

□ I think I remained agile, but my role was very different. Immediately I think of a couple of designers I respected who had 40 years' experience but were still very youthful in their thinking. Everyone is different. And I can't generalize at all. There were those designers who by age 30 or 35 were almost burned out. Then there were others age 60 or 65 who, when you choose their design, there's the same look in

their eyes that a 20-year-old has.

■ The world is filled with your designs. Is there one that, when you see it out on the road, you think to yourself, "Wow, that came out well"?

□ I think that about several of them for different reasons. CTS coupe, particularly the V. That was a car no one asked for. It was just someone in the studio had an idea and they brought it to me. I thought it was cool, said let's pursue it, and the leaders of the company loved it and it went into production. It went into production in a very different way, and it wasn't the result of a lot of market research. That's exciting. Then there are family cars where you put a lot of research into what the customers want and then, when you really nail it, that feels good. That's the very latest Malibu.

■ Is there one car you were involved with that, when you see it, you kind of cringe? A mistake?

□ Yeah, there are those cars that have been on the road a while that you just wish were no longer around. A couple cars from the days of Saturn. Saturn was a great learning experience, but some of the last Saturns really didn't hit the mark. It was like the brand had lost its way.

■ Now that your pension is secure and you're out of General Motors, are there other companies' designs that you really admire?

□ It's a shame that places like Bertone have gone away. It was like a religious experience being there. I'd love to work in that environment. Or Pininfarina. I'm a big fan of Aston Martin. And some of the work from Bentley. But there are a lot of cars that I just don't understand. I just think their execution is poor from a design perspective.

■ And those terrible cars would be...?

□ Yeah, there's one that stands out, but I'm not going to tell you what that is. Vehicles where things don't add up. There's one designer in the front, a very different one on the rear, and another on the sides. It really doesn't go together, and the nose looks like Darth Vader's face.

■ Are autonomous vehicles a particular design challenge?

□ I'm excited about them. When people talk about autonomous vehicles, they talk about vehicles very much like those we have now but with autonomous technology put in there. I think about that as well. But I also think about the experience that vehicle will be. Number one, autonomous will give people with disabilities [the ability] to travel from place to place when they want to do that. And for an aging population that probably shouldn't be operating a vehicle, it will give them that freedom. Beyond that, the whole experience of travel will be different. It can be a whole new dining experience. Think of it more as a dining room than "a car." Autonomous motorhomes through national parks. I'm totally thrilled. There's just such a wide variety of vehicles to be built.

■ Did you find that being an African-American was an

obstacle climbing through the ranks at GM?

□ When I started at GM, I was the first African-American designer they had hired. I never thought anything of it before I got there. Then I was the first African-American to be made a chief designer. Then I was the first to be an executive designer. I think the greater challenge was more for them than it was for me. As they learned over time, I wasn't that different from anyone else. My passion for design and automobiles was pretty much the same. But there were challenges along the way. There were those who thought GM would never make an African-American an executive designer, let alone VP of design.

■ And they were wrong.

□ Yeah.

■ Is there anything you'd have done differently?

□ I've had this focus on design for virtually all my life. At age eight, I told my parents I wanted to be a car designer for GM. There are things I've missed because of this tunnel vision. But it's been a wonderful career—well beyond my expectations. Working with such a diverse group of designers around the planet... who else has had the opportunity to do all I have done? ■

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